



**The World's Leading Cellular
Telephone Manufacturer**



Product Service Preview

Europe, Middle East & Africa Cellular Subscriber Group
Product Service Preview
Dual Band ZAP

ZAP CD920
INITIAL MARKETS
FUTURE MARKETS
EARLIEST RELEASE DATES

Middle Tier
South Afrika, Hong Kong, Switzerland (Stage I)
Wordwide
June (Stage I)



CD920 / flipped version



CD930 flipless version

OVERVIEW

The ZAP is a new platform which uses the GSM Dual Band Standard.
The ZAP will replace the 8000 series and SlimLite products in the mid tier of the market.

The product introduction will take place in three main stages.

ZAP Launch Stages	EUROPE	ASIA
Stage1: No EFR, black flipped variant only	Test makets in South Afrika and Switzerland Limited launch in Nordicmarkets for June only	Test market in Hong Kong; Launch with Asian SMS and Chinese languages in Asian markets
Stage2: Fully featured flipped variant	Full launch in Europe	Will NOT ship in Asia
Stage3: Fully featured flipless variant	Full launch in Europe	Full launch in Asia with Asian SMS and Chinese languages

Refresh

A Zap Refresh product has been defined for launch in September '98 (Stages IV and V), when the following key changes will be added:

- MMI Enhancements to SMS
- SIM Application Toolkit upgraded to full Class II
- Tri-Rate Codec (Full Rate, EFR and Half Rate)

A further refresh of the product may be made in Q1-99, to include the Whitecap chipset; adding features such as internal data and enhanced performance.

The ZAP will include all of the data features as in the 8700 product.

That includes support for:

- Ergonomically designed for comfortable handling
- Lage, Optimax TM high contrast display
- VibraCall TM vibrating alert as standart
- 3 minute VoiceNote TM message recording feature
- Dual-Band technology; the quality capacity solution

ACCESSORIES

Batteries and Doors

The batteries to be available for ZAP and their standby and talk times will be:

Battery Types	Part Number	Standby Time (Hrs)	Talk Time (Min)	Availability Notes
Weight Leadership 400mAh Li Ion	SNN5089	30-40	60-90	June 98
650 mAh AAA Long NiMH	SNN5291	60-80	150-180	June 98
1000mAh LGQ8 Li Ion	SNN5360	90-105	210-270	June 98
1100mAh AA NiMH	SNN5307	90-120	210-270	June 98
Performance Leadership 2800mAh Li Ion	SNN5260	200-250	480-600	June 98
Extended AA battery door Black	SHN6618			June 98
Extended AA battery door Grey	SHN6829			June 98
Extended AA battery door Blue	SHN6944			June 98
Performance Leadership battey door Blk	SHN6975			June 98
Performance Leadership battey door Gry	SHN6827			June 98
Performance Leadership battey door Blu	SHN6945			June 98

Chargers

The charger available for the ZAP will consist of a universal rapid travel charger with different plugs and a separate charger base which.

The part numbers for these will be:

Charger Type	Part Number	Availability Notes
Universal Rapid Travel Charger	SPN4278	As StarTac
Plug Euro	SYN4655	As StarTac
Plug UK	SYN4656	As StarTac
Plug Aus/ NZ	SYN4694	As StarTac
Plug Indian	SYN4696	As StarTac
Plug USA	SYN4657	As StarTac
Desktop Charger	SPN4523	June 98

Car Kits & Accessories

Car kits and accessories available for ZAP transceiver will be.

Car Kit or Accessory	Part Number	Availability Notes
Headset / Microphone	SYN6962	Same all products
Headset Adapter and Headset / Microphone	SLN3940<	June 98
Wireless Headset adapter and Earpiece	TBD	TBD
Cigarette Lighter Adapter	SYN4241	As StarTac
Hang Up Cup	SYN6911	June 98
Professional Car Kit with DSP	S8148	June 98
Professional Car Kit with DSP and VR	S8141	Q3, 98
Basic Car Kit	SLN3901	Q3, 98
Smart CELlect Data Cable & Soft Modem	CD1310	Aug 98

Carry Cases

The holsters and carry cases available for ZAP are as shown below:

Carry Case Type	Part Number	Availability Notes
Plastic Holster	SHN6851	June 98
Leather Holster with rotating belt clip	SYN6913	Aug 98
Leather Pouch with flip top	SYN6913	June 98

Data and Fax Modems / Connector Cable

Name	Part Number	Availability Notes
PC Card to Phone Connector Cable	SKN4821	As StarTac
CELlect TM 1 + German / English	S6112	As StarTac
CELlect TM + French	S6113	As StarTac
CELlect TM 1 + Italian / Spain	S6114	As StarTac
CELlect TM 3 Denmark	CD1181	As StarTac
CELlect TM 3 Germany	CD1177	As StarTac
CELlect TM 3 Finland	CD1183	As StarTac
CELlect TM 3 France	CD1179	As StarTac
CELlect TM 3 Italy	CD1175	As StarTac
CELlect TM 3 Norway	CD1182	As StarTac
CELlect TM 3 Sweden	CD1178	As StarTac
CELlect TM 3 Switzerland	CD1180	As StarTac
CELlect TM 3 UK	CD1176	As StarTac

SUPPLY POWER

The Power for the ZAP is supplied from the Batt or from an external accessory via the butt plug. The output from the batt is between 3.2V and 5V. This is stepped up via a booster circuit (U900 & discretes) to give 5.6 Volt dc, to supply the 5V regulator in the SIM interface and an input from U900 to generate L500, R475. The R275, L275 and R275 are generated in the U900 from B+.

RF POWER

The Rf Power levels for ZAP are the same as for all previous GSM / DCS products.

FREQUENCY OVERVIEW

GSM 900 Frequencies in MHz for ZAP are shown below:

CHANNEL	Tx	Rx	MAIN VCO	Rx Lf	Rx Lf L.O	Tx Lf	Tx Lf L.O
1-Low	890.2	935.2	720,2	215	430	170	340
62-Middle	902.4	947.4	732,4	215	430	170	340
124-High	914.8	959.8	744,8	215	430	170	340

GSM 1800 Frequencies in MHz for ZAP are shown below:

CHANNEL	Tx	Rx	MAIN VCO	Rx Lf	Rx Lf L.O	Tx Lf	Tx Lf L.O
512-Low	1710	1805	1590	215	430	120	240
700-Middle	1747,8	1842,8	1627,8	215	430	120	240
885-High	1785	1880	1665	215	430	120	240

OTHER NEW FEATURES

Real Time Clock

The ZAP comes with a real time clock which is shown on the display whenever the radio is on. This is powered by L275 when the radio is on, and by a Button Cell Battery located on the main PCB top of the shield SH1 near the antenna connector, when the radio is off. The clock uses a xtal as reference.

External Audio Digital / Analog

In ZAP audio speech to and from a hands free kit is passed digitally through the butt plug and is converted to and from analogue in the external DHFA box. The Audio In and Audio Out Lines are used for the analog Headset.

Full and Enhanced Full Codec support

The Zap supports in the version SUG1137A with *the SMOC* (Speechcoder and Modem) *the Full Rate* and the version SUG1165A / SUG1159A *with the Firestorm the Enhanced Full Rate*. This feature depends on the Network Provider.

DISASSEMBLY / ASSEMBLY TOOLS

Tools required for disassembly. Procedure to be included in Level 1 & 2 Service Manual.

Description	Part Number
T7 Torx Screw Driver (39Ncm)	-----

SERVICE SUPPORT

General

Schematics, component overlays, electrical and mechanical spare parts lists, and Level 1, 2, 3 and 4 Documentation will be available via CD described on following intranet page.

<http://emeacs.fle.css.mot.com/>

by April 1st 1998. Paper copies of diagrams are available by request to the responsible regional Hub Supporter. The documentation and diagrams available for the ZAP for each level are shown in the table overpage.

Documentation Content

Level 1&2	Available
Photographic Parts List	X
User Manual	X
Marketing Information Pack	X
Level 1 & 2 Service Manual	X
Model Accessories Catalogue	X

Level 3	Available
Product Service Preview	X
Colour Diagrams & Layouts	X
Charger Description	X
Battery Select Description	X
Debug Guides	X
Limited Parts List	X
Test Equipment Description	X
Full Board Layouts	X
Top Failure List	X

Level 4	Available
Product Description.	X
Interface Document	X
Full Schematics	X
Model Differences	X
Full Circuit Descriptions.	X
Troubleshooting Guide	X
Full Parts List	X

TESTING AND PHASING

For testing and phasing the equipment listed overpage is available to order.
If there are any queries regarding ordering or specifications of this equipment,
please contact Axel Schneider or Claus Hinrichsen.

Part Description	Part Number	Contact
GSM Test Box	-----	Field Support Engineer
Spectrum Analyser	-----	Field Support Engineer
Oscilloscope	-----	Field Support Engineer
Power Supply	-----	Field Support Engineer
Mini Test SIM Card GSM / DCS	8102430Z04	Motorola
Emmi - Butt plug Cable	SKN4779A	Motorola (same as StarTac)
Charged Batteries -	700 mAh AAA Long NiMH	Motorola
Rf Connector for butt plug	-----	Field Support Engineer
Complete Gate 22 Cable	ZA1000	AMS (Flensburg)
Motorola Win Gate 22 System	-----	Field Support Engineer
Secured Emmi - For Level 3 - Software 30.42	-----	Field Support Engineer
Unsecure Emmi - For Level 4 - Software 22.43	SLN3577B	Easter Inch Distribution Then Software Upgraded

PARTS IDENTIFICATION



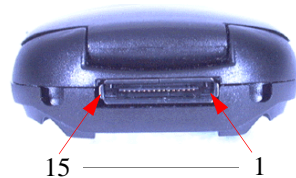
Main Battery Contacts



Backhousing



Butt Plug Configuration

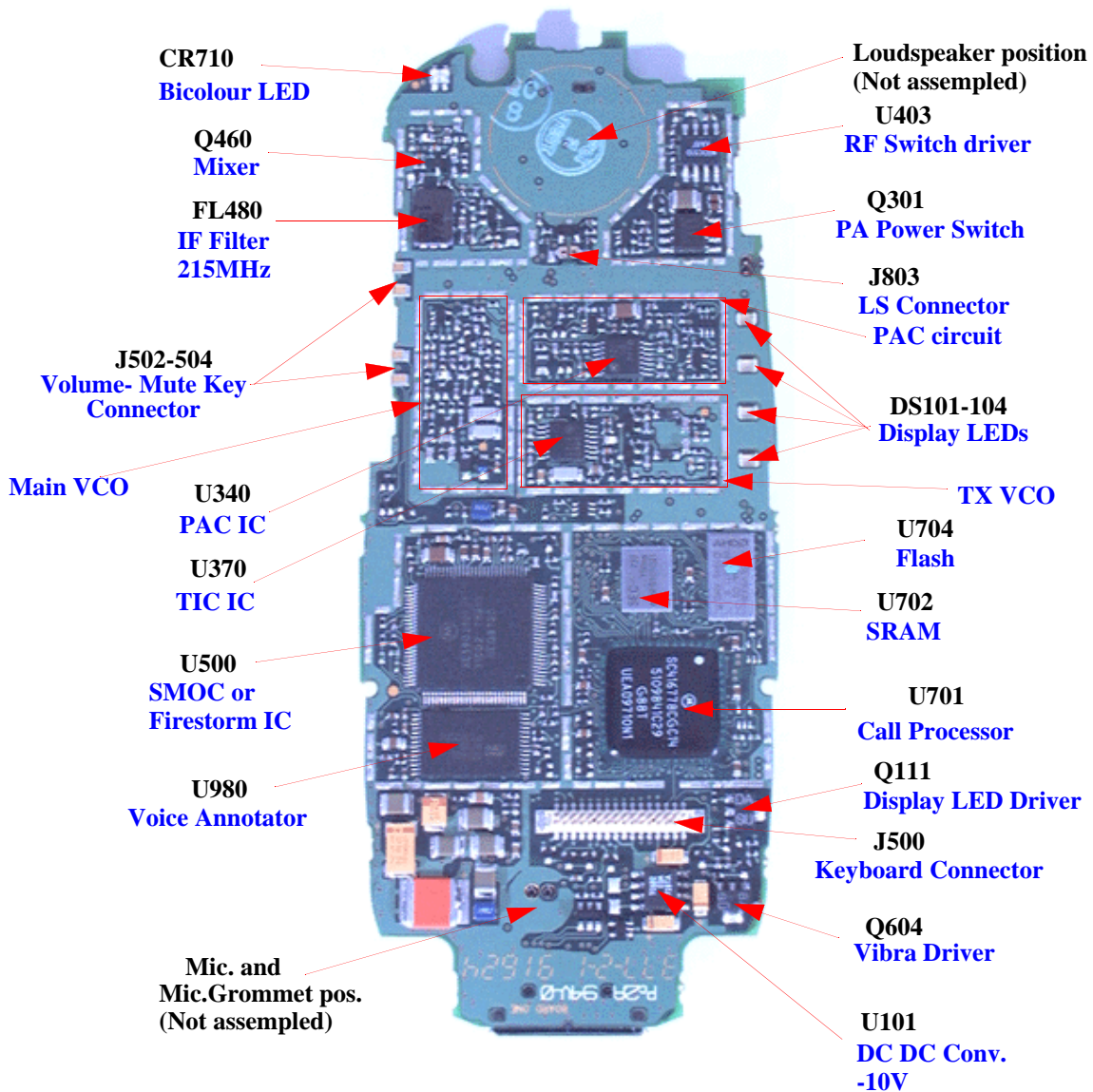


- 1 - Ground
- 2 - RF In/Out
- 3 - Ground
- 4 - Battery Feedback
- 5 - Manual Test Line
- 6 - RS232 Tx
- 7 - RS232 Rx
- 8 - Audio In / CHG_EN
- 9 - Audio Out / ON_OFF
- 10 - Ground
- 11 - Uplink
- 12 - Downlink
- 13 - DSC_EN_B
- 14 - EXT B+
- 15 - Ground

Inside of the Front and Backhousing



Main Board Top Side



Blue Text Description for Main Board Top Side:

CR710 Bipolar LED

3 Colour LED - Sign.: Red - No Service, Green - In Service, Orange - Camping or Roaming in other countrys

DS101 - 104 Display LEDs

FL480 IF Filter 215 MHz

215 MHz Saw Filter with GSM -4,5dB / DCS 4,5dB loss.

J500 Keyboard Connector

32 Pin Connecetor between Main Board and Keyboard.

J502 - 504 Volume - Mute Key Connector

Four Pads, to connect the Switch Interface PCB to the main PCB.

J803 LS Connector

2 Pin SMD Connector to connect the Loudspeaker.

Q111 Display LED Driver

Driven by BL_CNTL. Part of the CPU backlight control Circuit - Switches DS101-104.

Q301 Pa Power Switch

Dual Transistor P- Chan. Mosfet used to switch the B+ supply for the PA.

Q460 Mixer

Mixer in Rx Signal Path switched by RX_EN and supplied by RX275 for mixing Rx Antenna Frequency and Main VCO Frequency to 215 MHz IF.

Q604 Vibra Driver

Power PNP Transistor switched by VIB_EN and supplied by B+ to enable the Vibrator.

U101 DC DC Conv. -10V

Converts L500 to -10V to supply U403 (RF Switch) and the GSM_DCS Switch Circuit to generate FLTR_-10V used in the IPA to switch the GSM_DCS Filter and the PA.

U340 Pac IC

Power Amplifier Control IC. Controlled by TX_EN.

U370 TIC IC

Mixer and phase detect to control the Tx VCO.

U403 RF Switch

Controlled by RX_EN and TX_EN. Used to select between internal and EXT Antenna, controls the Antenna Switch U401 via V1 and V2 line.

U500 SMOC IC

High integrated mask programmed processor. Controls data exchange between the phone and the network and the digital audio process.

U701 Call Processor

Same as Modulus but now in Ball Grid Area technologie (chip sized reduced) .This is very difficult to change.

U702 SRAM

Used as buffer storage for the Call Processor.

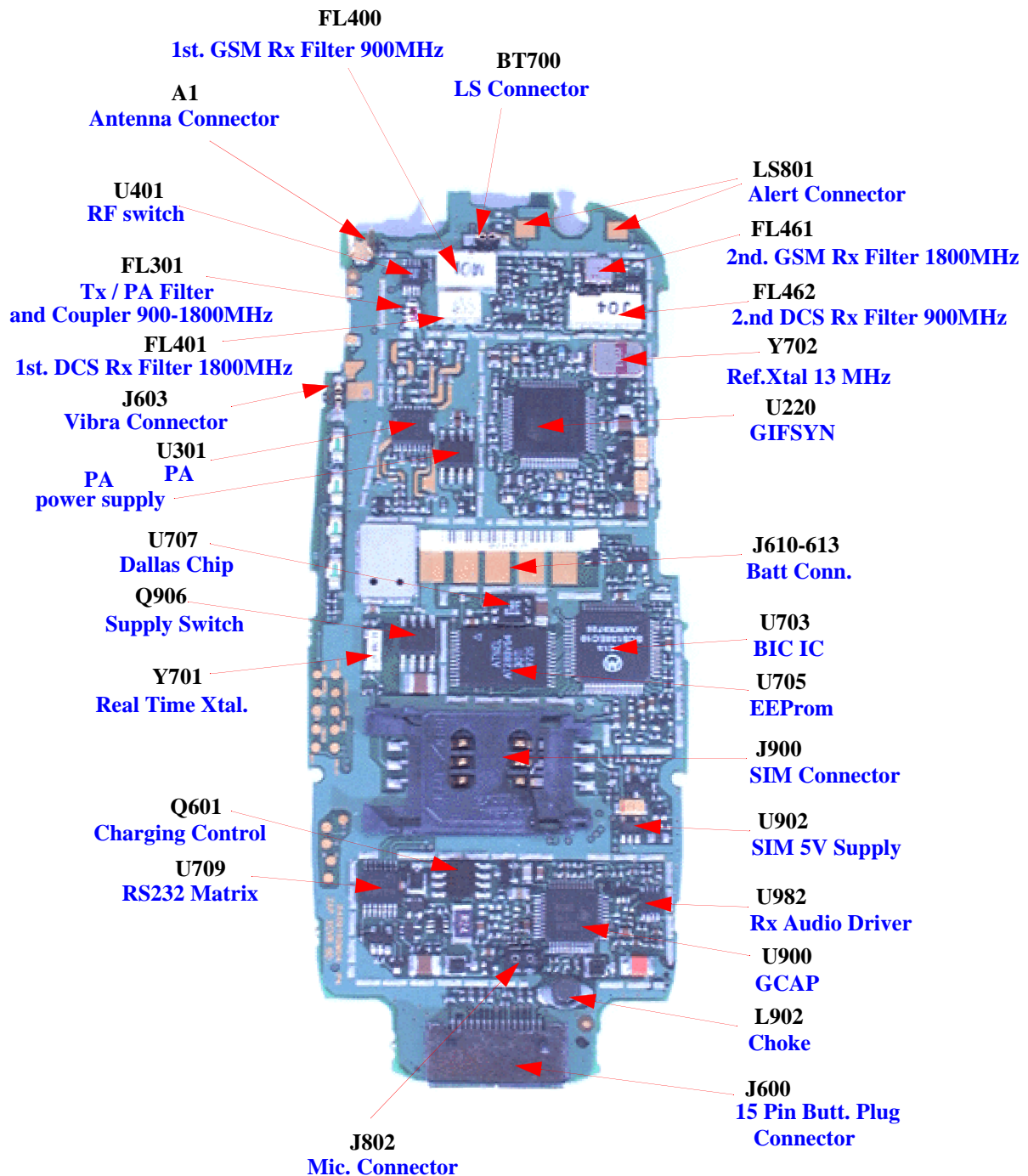
U704 Flash

Used to store the Software. Able to reflash for updates.

U980 Voice Annotator

New Chip for recording up to 180 seconds of receiving audio signals, or in stand by voice notes. Controlled from the CPU via Serial Data Bus.

Main Board Bottomside Side



Blue Text Description for Main Board Bottom Side:

A1

Connects the antenna directly, not as in past products inductively.

BT700

2 Pin SMD Connector to connect the Buffer Battery for the Real Time Clock.

FL301 TX / PA Filter and Coupler

Bandpass Filter 900 / 1800MHz with separate output to PAC IC for measuring the TX Power.
GSM -0,6dB / DCS -1,0dB loss.

FL400 1st. GSM Rx Filter 900 MHz

Pass-band filter (925-960 MHz) with -2,2dB loss.

FL401 1st. DCS Rx Filter 1800MHz

Pass-band filter (1805-1880 MHz) with -2,2dB loss.

FL461 2nd. GSM Rx Filter 900MHz

Pass-band filter (925-960 MHz) with -2,2dB loss.

FL462 2nd DCS Rx Filter 1800MHz

Pass-band filter (1805-1880 MHz) with -2,2dB loss.

J600 15 Pin Butt. Plug Connector

Main Lines - Provides an interface between board and any external device. Main lines - [Uplink/Downlink Comms Lines](#), [Audio IN/OUT Lines](#), [DSC Enable Line](#), [RF In/Out Line](#), [Battery Feedback](#), [Manual Test](#) and [external power line](#).

J603

2 Pin SMD Connector to connect the Vibra.

J610-613 Batt.Conn.

5 Print Pats to connect the clips in the Backhousing.

J802 Mic. Connector

2 Pin SMD Connector to connect the Microphone.

J900 SIM Connector

6 Pin Connector without SIM detect switch.

L902 Choke

Part of the Switch Mode Power Supply, boosting the supply voltage up to 5.6Vdc. Driven by U900.

LS801

Two Print Pats to connect the Alert.

Q601 Charging Control

Part of charger circuit and used as current control , adjusted by the CHRGC output from U900.

Q906 supply Switch

Dual Transistor P- Chan.Mosfet used to switch between L_BATT+ and EXT_B+ in the Warm Switch Over Circuit.

U220 GFSYN

Integrated Guss and IF. (modulation , demodulation, Main- and Reference PLL control).

U301 PA

GaAs Fet amplifier.

U703 BIC IC

Works as a data interface between external accessories, and emmi box via the butt plug. It is also uses A/D Converters to provide DAC information to U701 on the level of the supply voltages.

U705 EE Prom

Stores all data such as phasing, serial numbers, EMEI, telephone numbers etc.

U707 Dallas Chip

Provides the Unit for copying the EE Prom. Each Dallas Chip and EEPROM are a set. If only one is replaced the unit won't start.

U709RS232 Matrix

Part of the RS232 Switch Matrix.

U900 GCAP

Provides regulated output voltages for the board, drives a switch mode power supply, controls battery charging and audio logic circuitry.

U902 SIM 5V Supply

Supplies the SIM Chip with 5V controlled by VSWITCH.

U982 Rx audio Driver

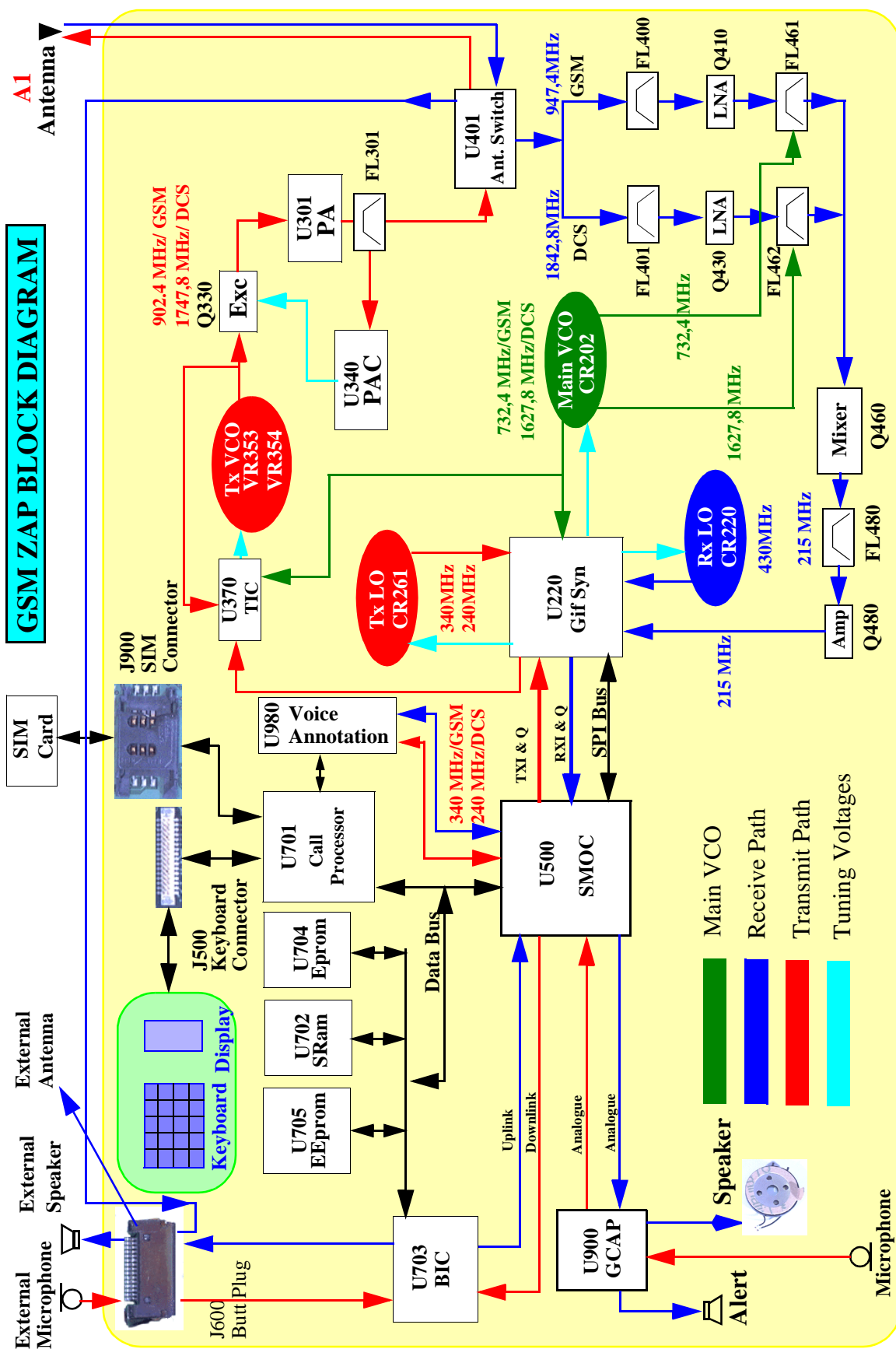
This Dual Amplifier is Part of the Voice Annotation Circuit

Y702 Ref.Xtal 13MHz

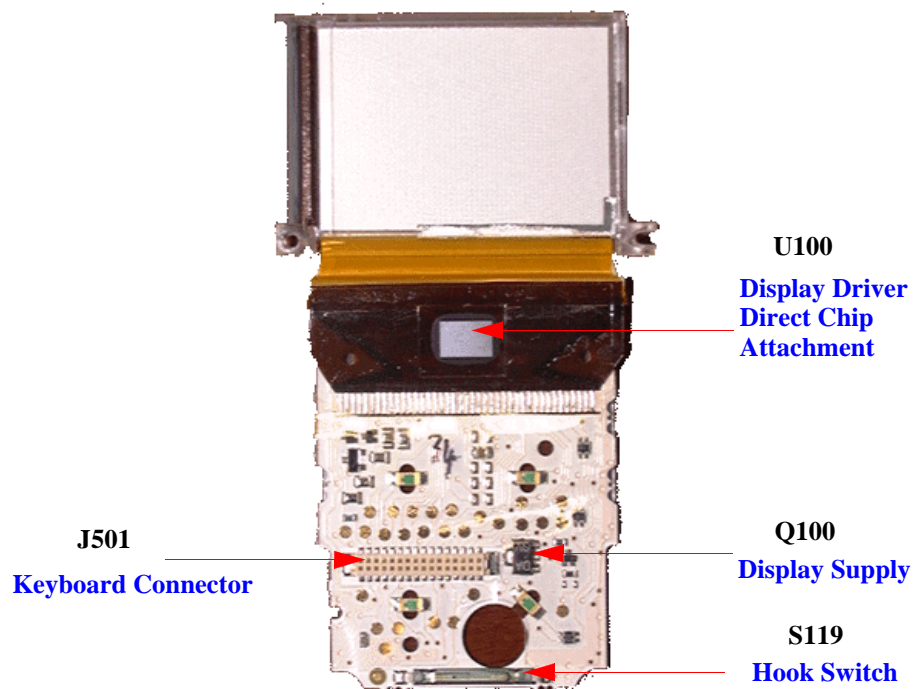
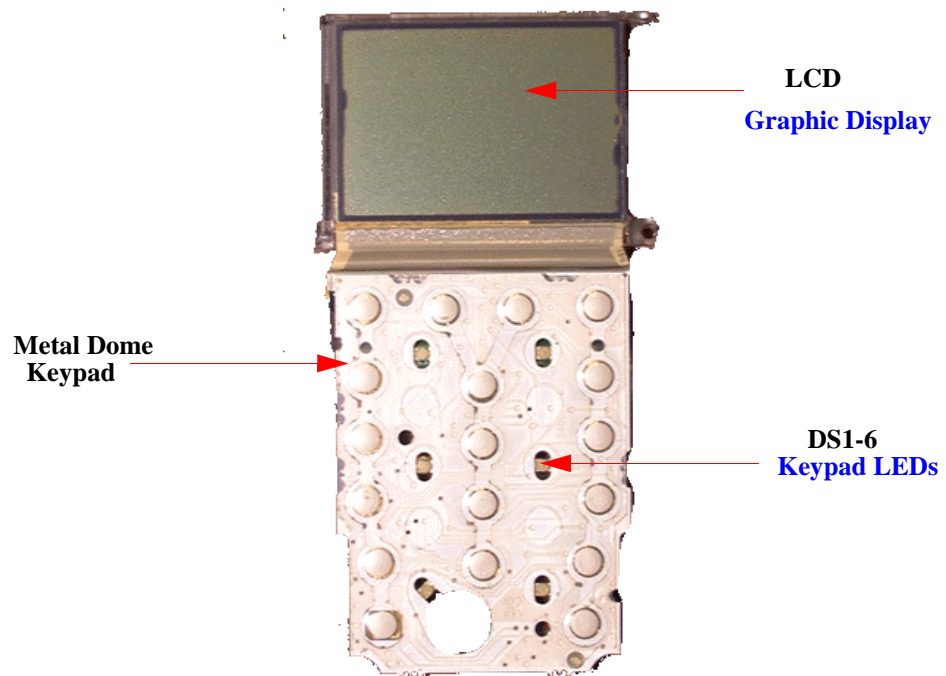
Xtal. oscillator running on 13 Mhz and is taken as reference frequency for the whole radio.

Y701 Real Time Clock Xtal

This xtal is of a very high accuracy and provides 32.768KHz for the real time clock.



Display Board





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Cellular Subscriber Group*

Motorola cd900 Series

Standard Customer Presentation

June 1998



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Cellular Subscriber Group

Standard Customer Presentation

Contents

- Introduction
- Key Consumer Selling Points
- Key Network Features
- Product Positioning
- Product Specification
- Product Performance
- Feature Specification
- Full Feature List
- Accessory Range
- Product Variants
- Product Customisation
- Competitors
- Marketing Support



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Motorola cd900 Series

Introduction



*Don't fly in and out
of the Office.
Take it with you.*





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Motorola cd900 Series

Key Consumer Selling Points

- Designed to be compact and very portable
- Optimax™, high contrast, easy to read display
- VibraCall™ vibrating alert as standard
- 3 minute VoiceNote™ message recorder
- Future proofed with GSM900/1800 Dual-Band technology



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Key Network Features

- Dual-Band (GSM900/1800)
- Enhanced Full Rate Codec (EFR)
- SIM Application Toolkit
- Research proven design
- Data capable without PC card



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Motorola cd900 Series

Product Positioning

- In the Motorola Product Range
 - Mid-tier
- Targeted at Business Users
 - Flipped version to eventually replace International 8000 series
 - Flipless version to eventually replace Slimlite
- Relative to Competitors
 - In the same tier as Nokia 6110, Ericsson 888, Philips Spark, Siemens S10



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Motorola cd900 Series

Product Specification

- Size, Weight, Performance
 - 139 cc; 120 gm minimum; 145gm standard package
 - 210-270 mins talktime, 90-105 hrs standby standard package
 - up to 10 hours talktime, 250 hours standby
- Standard Package includes
 - cd920 or cd930 transceiver
 - 1000 mAh LiIon battery
 - Rapid Travel Charger with either UK or Euro plug
 - Pivoting Belt Holster
 - Local language user guide
 - Accessory leaflet and other local literature kit
- Walk and Talk Package includes standard contents plus PHFA
- Data Package includes standard contents plus Smart CELlect™



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Standard Package



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Product Performance

	400 mAh Li Ion	650 mAh Ni MH	1000 mAh Li Ion	1100 mAh Ni MH	2800 mAh Li Ion	AA Alkaline
Volume (cc)	139	139	139	160	189	160
Weight (gm)	120	147	145	185	230	depends on batteries
Dimensions (mm)	130x55x27	130x55x27	130x55x27	130x55x32	130x55x43	130x55x32
Talktime: up to (mins)	60 - 90	150 - 180	210 - 270	210 - 270	480 - 600	depends on batteries
Standby time: up to (hours)	30 - 40	60 - 80	90 - 105	90 - 120	200 -250	depends on batteries
Charge time: to 90% (hours)	2	1	3	1.5	4	n/a

Standard Package Highlighted in Red. Charge times are with Rapid Travel Charger or optional Desktop Charger accessory. All times are approximate and will vary depending on network configuration and status, and the functions selected. Standby times are quoted as a range from DRX=2 to DRX=9. Talktimes are quoted as a range from DTX off to DTX on. Support of DTX mode is dependent on the network and may not be available in all areas.



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Motorola cd900 Series

Main Feature Specification

- Dual-Band (GSM900/1800)
- Optimax™, high contrast display
- VibraCall™ Alert
- VoiceNote™ Recorder (3min)
- Clock and Date
- Pivoting Belt Holster
- SIM Application Toolkit
- Data capable without PC card
- Enhanced Full Rate Codec (EFR)
- Rapid Travel Charger
- Takes Standard AAs (for emergency use)
- LED Status Indicator
- Operator defineable ringing melody
- Fixed Antenna (end user preference)
- Popular, Ergonomic design
- LiIon batteries as standard



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Motorola cd900 Series

Full Feature Specification

User Interface

Display type

- *Illuminated Graphic*
- *up to 4 lines of text*
- *Optimax™ High Contrast*

Display icons

- *Battery Meter*
- *Signal Strength*
- *Off-hook*

- *Roaming*

- *Home Zone**

- *Text Message Waiting*

- *Voice Message Waiting**

- *Ringling Alert On*

LED Status Indicator

Dedicated Control Buttons

- *Quick Access*
- *Smart Button*
- *Volume keys*
- *VoiceNotes™*

Languages

- *16 European languages*
- *Automatic selection determined by SIM card*

Alert types

- *VibraCall™ vibrating alert*
- *11 different ringertones*
- *Visual alert*

Flip to answer/end calls (cd920 only)

Postscripting

- *short cut number entry system*

Illuminated Keypad

Personalised Menu List

Telephone Directories

Phone based directories:

- *Phone book (100 names & numbers)*

- *last 10 calls made*

- *last 10 calls received or missed*

SIM Card based directories:

- *Phone book (upto 155 names & numbers depending on SIM)*

- *Fixed Dialling List (upto 40 names & numbers)**

- *Service Dialling List (dependent on Service Provider)**

Advanced Features

VoiceNotes™

- *upto 3 minutes of messages*

- *upto 99 separate messages*

Real Time Clock, with Date

Call Control

Call Diverting

Call Barring

Hold Call

Call Waiting

Calling Line Identification (name displayed if in Phonebook)

Missed Call Indicator

International Access Key Sequence

Key Answer Only (cd920 only)

User Call Rejection

Conference Calling*

Call Transfer*

Mute Call

Automatic Redial - on busy

Call Cost Control

- *Advice of Charge (Charging and Information)**

- *Programmable Audible Call Timers*

- *Display Call Timers or charge meters*

Network Related

Dual-Band GSM900/1800 operation

SIM Application Toolkit support

EFR Enhanced Voice Quality*

Voice encryption with A5/2 Algorithm

Non-Voice features

Text Messaging*

- *Send Short Messages*

- *Receive Short Messages*

- *Cell Broadcast*

Fax*

- *Alternate between fax and voice (TS61)*

Data*

- *upto 9600 bps standard operation*

- *upto 36000 bps (with optional CELLECT™ 1+ and Smart CELLECT™ accessories)*

- *upto 56000 bps (with optional CELLECT™3 accessory)*

Security

Phone Lock

- *manual*

- *automatic*

SIM Card Lock

- *SIM PIN*

- *SIM PIN 2*

Keypad Lock

Restrict Access to Phone Directories

* Network or Service Provider dependent feature



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Motorola cd900 Series

Accessory Range



- Rapid Travel Charger
 - Same as StarTAC (SPN4278, plus appropriate plug)
 - Included in every package



- Rapid Desktop Charger
 - *New*; can charge phone and second battery (SPN4523)



- Headset with Microphone (PHFA)
 - *New*; accept and end calls while phone is in holster (SLN3940)



- Pivoting Belt Holster
 - *New*; brings *wearability* to a new market segment (SHN6851)
 - Included in every package
- Leather carry cases
 - *New*; leather pouch stylish alternative to the plastic holster (SYN6913)
 - *New*; leather holster with rotating belt clip (SYN7380)



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Motorola cd900 Series

Accessory Range



- Cigarette Lighter Adapter
 - Same as StarTAC (SYN4241)



- Professional Install Digital Handsfree Car Kit
 - *New*; full duplex operation (S8142)

- Professional Install Digital Handsfree Car Kit with Voice Recognition
 - *New*; allows storage and retrieval of 20 names and numbers (S8141)



- Smart CELlect™ data cable
 - *New*; allows full data and fax functionality without PC Card (CD1310)

- Range of Batteries

- 650 mAh NiMH (SNN5291)
- 1000 mAh LiIon (SNN5360)
- 1100 mAh NiMH + battery door (SNN5307 + SHN6618)





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Motorola cd900 Series

Product Variants

cd920
Black



cd920
Grey



cd920
Blue



- Two designs
 - cd920 - Flipped version
 - cd930 - Flipless version
- Three plastic colours
 - Black
 - Magix Grey
 - Ten-Pin Blue

cd930
Black



cd930
Grey



cd930
Blue





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Motorola cd900 Series

Product Customisation

- Opportunities
 - Physical changes
 - Front escutcheon
 - Box artwork, within brand guidelines
 - Flexing changes
 - Wake-up graphic
 - Menu structure and feature set
- Rules
 - No changes to lens, housing, keypad or branding on rear of product
 - No changes to transceiver or box labels, except to reflect product name or EAN
 - space on Transceiver label limited to 10 characters
 - Box artwork must conform to new Motorola brand guidelines
 - No changes allowed to inside of manuals
 - cover can be customised for large customers, within POD and brand guidelines
- Minimum volume for any change is 50k units over a 12 month period

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Motorola cd900 Series

Competitors

	Standard Package		Best Performance		Strengths	Weaknesses
Motorola cd920 or cd930	Size (cc)	139	Smallest size (cc)	139	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Ergonomic designs • VoiceNote & VibraCall • Optimax display 	<ul style="list-style-type: none"> • No Infra-Red port • No Half Rate Codec
	Weight (gm)	145	Lowest weight (gm)	120		
	Talk time (mins)	210-270	Talk time (mins)	480-600		
	Standby time (hrs)	90-105	Standby time (hrs)	200-250		
Ericsson sh888 or sf888	Size (cc)	140	Smallest size (cc)	*	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Internal data card built-in • Infra-Red port • Enhanced Full Rate Codec 	<ul style="list-style-type: none"> • Expensive • No Half Rate Codec • Old form factor
	Weight (gm)	195	Lowest weight (gm)	173		
	Talk time (mins)	210-265	Talk time (mins)	315-400		
	Standby time (hrs)	upto 80	Standby time (hrs)	upto 120		
Nokia 6150 <i>(Dual-band version of 6110; expected end Q3-98)</i>	Size (cc)	130	Smallest size (cc)	130	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Infra-Red port • Reminders and Games • Call Screening 	<ul style="list-style-type: none"> • Gimmicky features • Late to market • Limited Infra-Red functionality
	Weight (gm)	142	Lowest weight (gm)	142		
	Talk time (mins)	180-300	Talk time (mins)	300-480		
	Standby time (hrs)	60-260	Standby time (hrs)	100-450		
Siemens S15	Size (cc)	160	Smallest size (cc)	160	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Easy to use • Dynamic character size • Calculator function 	<ul style="list-style-type: none"> • OEM version from Bosch • Consumer oriented • No EFR or HR Codecs
	Weight (gm)	185	Lowest weight (gm)	185		
	Talk time (mins)	upto 180	Talk time (mins)	upto 600		
	Standby time (hrs)	upto 80	Standby time (hrs)	upto 220		
Bosch Dual-Com 738	Size (cc)	*	Smallest size (cc)	*	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Belt clip accessory • Vibrating battery access'y • Calculator function 	<ul style="list-style-type: none"> • Consumer oriented • No EFR or HR Codecs
	Weight (gm)	192	Lowest weight (gm)	174		
	Talk time (mins)	200	Talk time (mins)	575		
	Standby time (hrs)	80	Standby time (hrs)	220		
Mitsubishi MT-D30 <i>(expected end Q2-98)</i>	Size (cc)	168	Smallest size (cc)	168	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Rocker menu key • Closed User Group • Conference Calling 	<ul style="list-style-type: none"> • Consumer oriented • No EFR or HR Codecs
	Weight (gm)	185	Lowest weight (gm)	185		
	Talk time (mins)	upto 180	Talk time (mins)	upto 240		
	Standby time (hrs)	upto 110	Standby time (hrs)	upto 180		
NEC DB2000 <i>(Low tier model G10 also expected Q3-98)</i>	Size (cc)	100	Smallest size (cc)	100	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Metallic finish • Vibrating alert as standard • LiIon battery as standard 	<ul style="list-style-type: none"> • No Half Rate Codec • No Infra-Red port
	Weight (gm)	120	Lowest weight (gm)	120		
	Talk time (mins)	upto 150	Talk time (mins)	upto 300		
	Standby time (hrs)	upto 300	Standby time (hrs)	upto 600		
Nortel/AEG/Matra 2785 <i>(Expected end Q3-98)</i>	Size (cc)	*	Smallest size (cc)	*	<ul style="list-style-type: none"> • Dualband <u>PLUS</u> E-GSM • 14,400 data capable • Handsfree mode • Voice control and calling 	<ul style="list-style-type: none"> • Expensive • No Infra-Red port
	Weight (gm)	*	Lowest weight (gm)	165		
	Talk time (mins)	*	Talk time (mins)	360		
	Standby time (hrs)	*	Standby time (hrs)	280		

* Not known



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Motorola cd900 Series

Marketing Support

- Advertising
 - TV adverts are Brand only; not product specific
 - Press adverts
 - Full Page Motorola, Co-Op and Dealer advert templates available
- Point of Sale
 - Product leaflets
 - cd900 series Accessory leaflet
 - POS Kit
 - 4 x cubes
 - 1 x poster
 - 1 x literature dispenser
 - 1 x 'Open / Closed' door sign
 - 1 x window sticker
 - 1 shelf wobbler
 - 1 x instore banner
 - Dummies

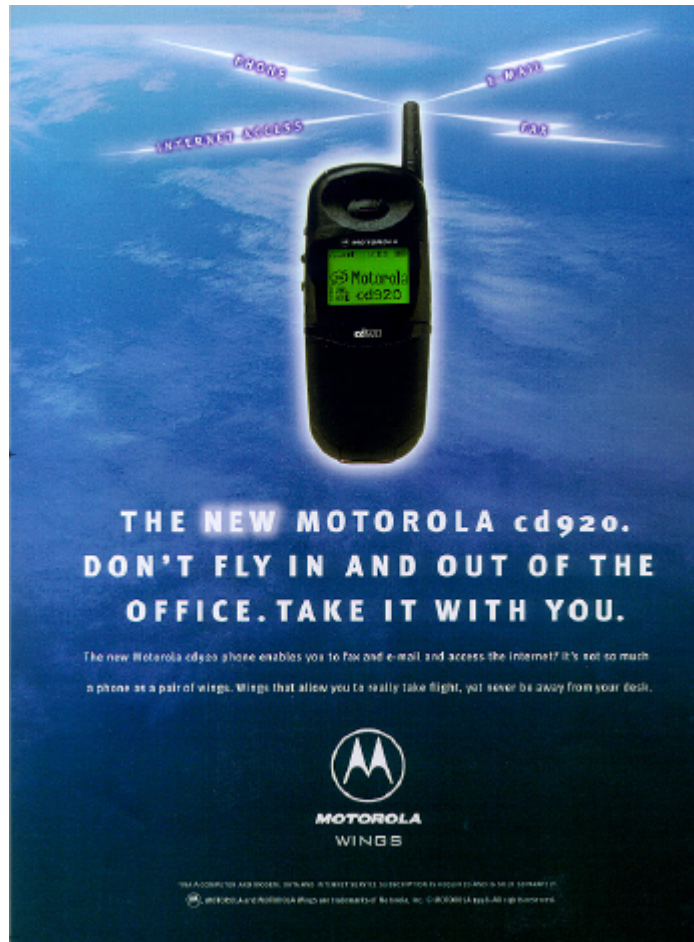


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Motorola cd900 Series

Press Advert



THE NEW MOTOROLA cd920.
DON'T FLY IN AND OUT OF THE
OFFICE. TAKE IT WITH YOU.

The new Motorola cd920 phone enables you to fax and e-mail and access the Internet! It's not so much a phone as a pair of wings. Wings that allow you to really take flight, yet never be away from your desk.


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WINGS

THE ACCESSORY AND MODEL, DESIGN, IS SUBJECT TO CHANGE. DESCRIPTION IS SUBJECT TO CHANGE WITHOUT NOTICE.
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Motorola cd900 Series

Marketing Support cont.

- Channel Support
 - Call Centre Fulfilment Pack
 - Trade Launch Communications Pack
 - Web Pages
- Training Materials
 - Internal Motorola Materials
 - Standard Presentation (this !)
 - Product Launch Manual
 - Channel Training Materials
 - Roadmap Mini-Training Guide
 - Roadmap Standad Presentation
 - Accessories Training Pack
- Other Resources
 - Consumer PR Kit
 - Video, Product and Lifestyle Image libraries



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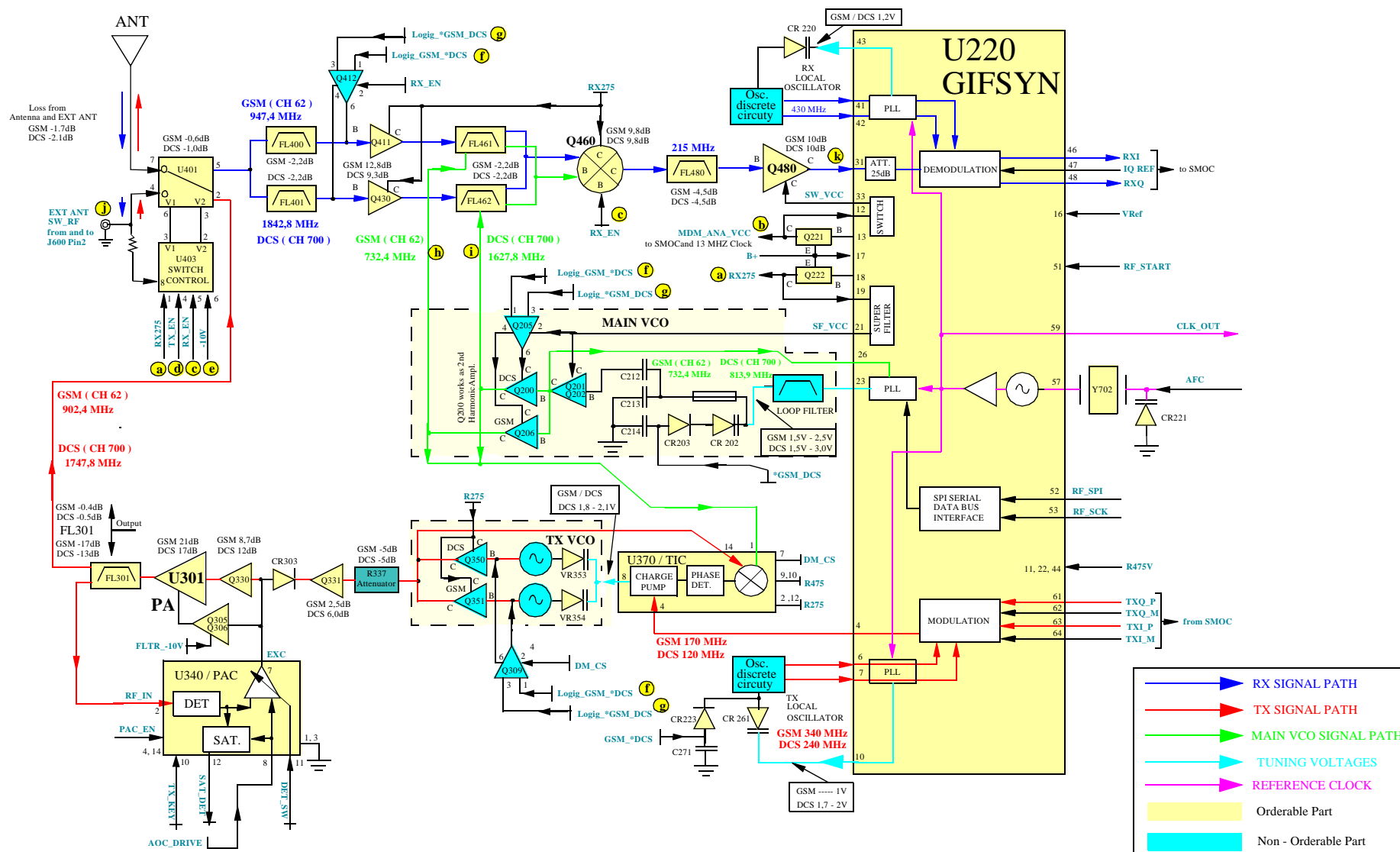
Motorola cd900 Series

For Further Information



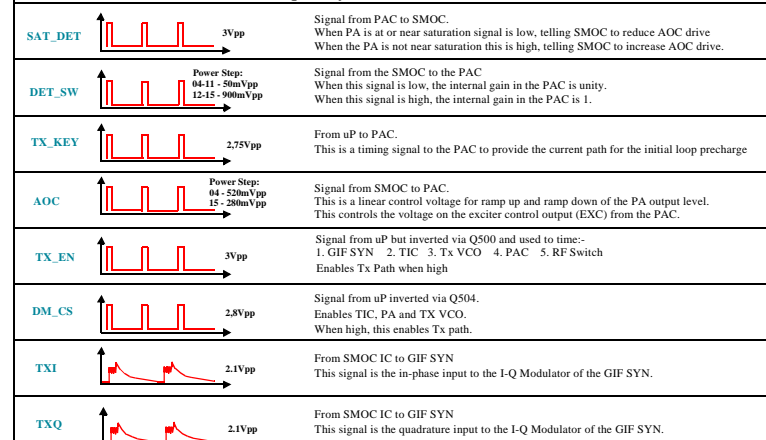
wings.motorola.com - New “Wings” Web site

DUAL BAND ZAP RF BLOCK DIAGRAM

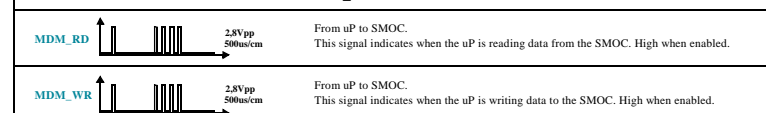


RF BOARD SIGNALS

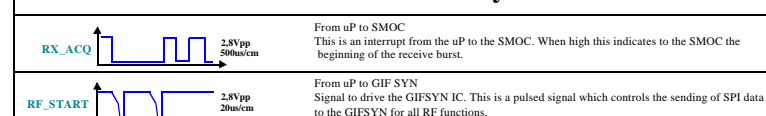
Tx SIGNALS - 110062#, 1215#, 310# Frequency 217Hz - 1ms/cm



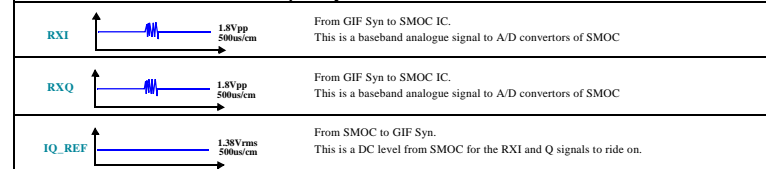
Modem Callprocessor Interface



Rx SIGNALS - In Standby Mode



Rx SIGNALS - 110062#, 262000#, 25013#, 241# Frequency 217Hz - 1ms/cm



RF LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
A1	Antenna Connector	3909155T01	Q350-351	TX VCO Transistor	4809940E01
CR202	Main VCO Varactor	4809641F02	Q411	Receive Power Transistor	4809527E24
CR203	Main VCO Diode	4809948D10	Q412	GSM / DCS Switch	4809939C07
CR220	RX Local Osc. Varactor	4809641F02	Q430	Receive Power Transistor	4809527E32
CR221	Master Xtal Varactor	4809641F04	Q460	Receive Mixer Transistor	4809527E20
CR223	Tx Local Osc. Diode	4809948D05	Q480	IF Isolation Amplifier	4809940E01
CR261	Tx Local Osc. Varactor	4809641F02	U220	GIFSYN IC	5109632D92
CR303	TX Exciter Diode	4809948D10	U401	Antenna Switch IC	5109572E04
FL301	1st Rx Filter	9109193T05	U403	Switch Control	5109923D14
FL400	2nd Rx Filter	9109144M01	U301	PA Dual FET IC	4809527E31
FL401	VCO Filter	9109111C08	U370	TIC IC	5109879E12
FL480	IF Saw Filter	9109035M01	U340	PAC IC	5109632D91
FL461	RX GSM Injection Filter	9109157M01	VR353	TX VCO Varactor	4809877C06
FL462	RX DCS Injection Filter	9109429J04	VR354	TX VCO Variator	4809877C04
Q200	Main VCO Transistor	4809527E30	SH1	Shield Low Noise Ampl.	2609474M01
Q201-202	Main VCO Transistor	4809527E24	SH2	Shield PA	2609475M01
Q205	GSM / DCS Switch	4809939C07	SH3	Shield GIFSYN	2609476M01
Q221-222	Supply Transistor	4809579E18	SH4	Shield Exciter	2609477M01
Q305-306	PAC Transistor	4809939C06	SH5-SH7	Shield VCO TIC	2609480M01
Q309	GSM / DCS Switch	4809939C07	SH8	Shield Mixer Iso Ampl.	2609478M01
Q330	TX Buffer	4809527E26	SH9	Shield Rf Switch	2609479M01
Q331	TX Predriver	4809527E24			

TEST COMMANDS

#	press 2 sec.	Enter Manual Test Mode with Test Card
01 #		Exit Manual Test Mode
07 #		Mute Rx Audio Path
08 #		Unmute Rx Audio Path
09 #		Mute Tx Audio Path
10 #		Unmute Tx Audio Path
11 xxxx #		Program Main Local Osc. to Channel
12 xx #		Set Tx Power level to fixed value
19 #		Display SW Version Number of Call Processor
20 #		Display SW Version Number of Modem
22 #		Display SW Version Number of Speech Coder
25 #		Set Continuous AGC
26xxxx #		Set Continuous AFC
31x #		Initiate Pseudo-Random Sequence with Midamble
33xxxx #		Synchronize to BCH Carrier
36 #		Initiate Acoustic Loopback
37 #		Stop Test
45xxxx #		Serving Cell Power Level
46 #		Display Current Value of AFC DAC
47x #		Set Audio Volume
58 / xxxxx #		Display / Modify Security Code
59 / xxx #		Display / Modify Lock Code
60 #		Display IMEI
7100 #		Display Error Code

RECEIVE DEBUG - GSM MODE

Before actually removing any cans it may be worth checking the RX275 (a), MDM_ANA_VCC (b), RX_EN (c), -10V (e), and if the Logig_GSM_*DCS (f) is high to switch the output of Q412 Pin6 and Q205 Pin4 to high.

TEST MODE: Type in Key commands: 110062#, 262000#, 25013#, 241#. Test for a set level eg. (-30dB) at point (j) to compensate cable losses.

The only real short-cut we can take is by probing the 215MHz test point (k) (pin 31 of GIF).

- If the 215 is OK then we can assume problem lies around GIF, either 430MHz Local Oscillator or in generation of RXI and RXQ. The can SH03 should then be removed. Check that IQ Ref from the SMOC is around 1.38Vdc and then the RXI and Q outputs from the GIF to check which is faulty.
- If the 215MHz is low probe the R.F inputs to the Mixer to see which RF path (RF INPUT or MAIN VCO) the fault lies on.
- If Main VCO is low, the main suspicions are with the main VCO, or the VCO filter (FL461/462) and the SH07 can should be removed.
- If the input to the filter is low, then there is some discretes under the VCO can. Check SF_VCC U220 Pin23 and Main VCO tuning voltage U220 Pin21.
- If RF INPUT, and the MAIN VCO OK, the main suspicions are with the 2 input filters FL400 and FL401 and the can SH01 should be removed. If the signal is low at the input to these, it could be losses caused by the Antenna Switch U401.
- If 947.4 and 794.4 RF values are fine but 215MHz into GIF is low (k), then we must also remove can SH08. The SAW filter (FL480) and IF Isolation AMP (Q480) is located under here.

FREQUENCIES GSM / DCS

GSM / CHANNEL	Tx	Rx	MAIN VCO	Rx LF	Rx IF LO	Tx LF	Tx IF LO
1-Low	890.2	935.2	782.2	215	430	170	340
62-Middle	902.4	947.4	794.4	215	430	170	340
124-High	914.8	959.8	806.8	215	430	170	340
DCS / CHANNEL	Tx	Rx	MAIN VCO	Rx LF	Rx IF LO	Tx LF	Tx IF LO
512-Low	1710	1805	1590	215	430	120	240
700-Middle	1747.8	1842.8	1627.8	215	430	120	240
885-High	1785	1880	1665	215	430	120	240

TRANSMIT DEBUG

Put the phone into test mode and key in the commands: 110062#, 1200#, 310#

Firstly if no **Transmitter output** we should check the modulation output at U220 Pin 4 and the Main VCO at point (b) (e) to establish which of the signals are missing or if both the signals are missing.

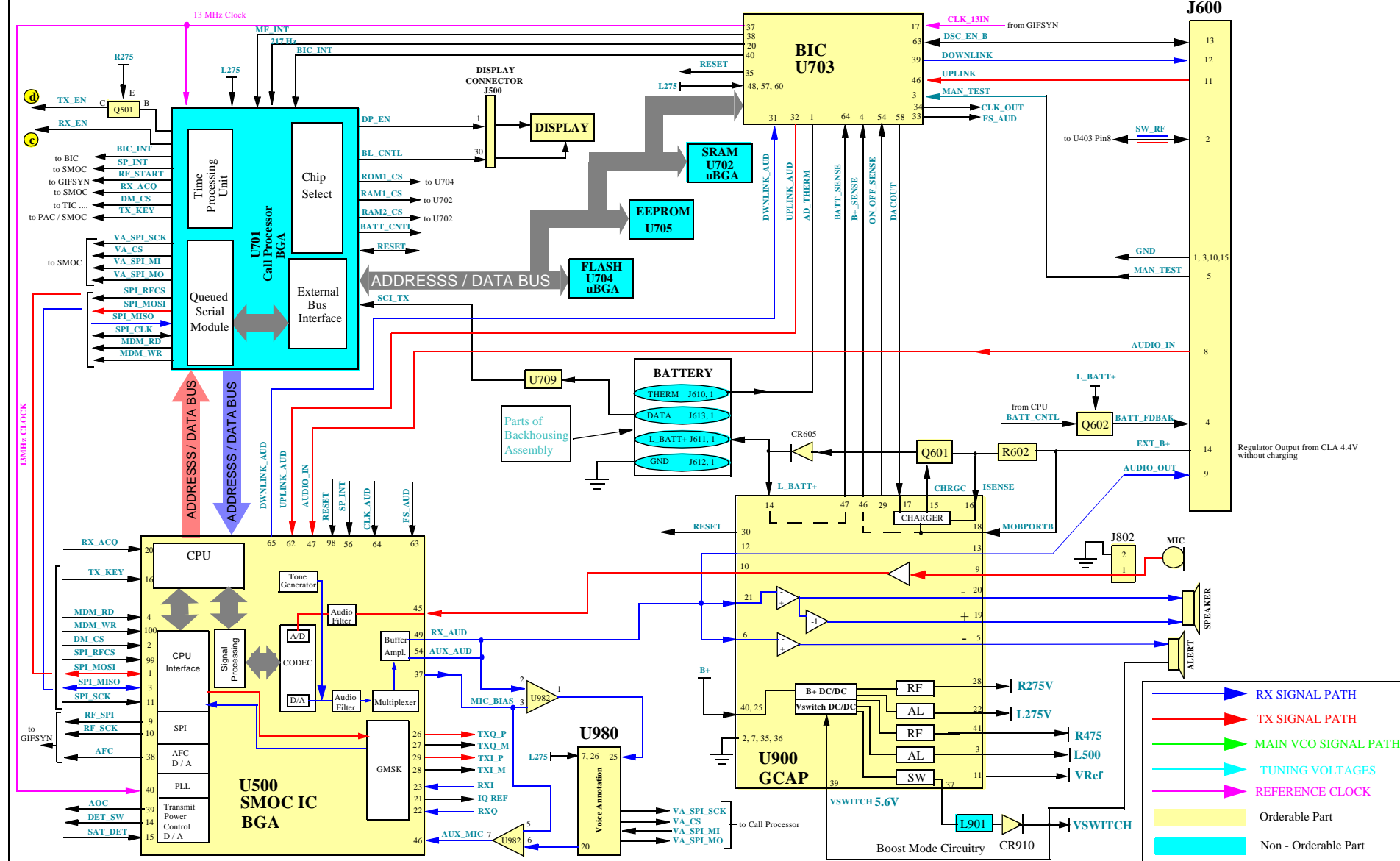
- If the modulation output is missing and Main VCO is fine then remove SH03 and check in the TX Local Oscillator the CR212 and the tuning voltage from U220 Pin10. Check if Q222 and Q221 have both 2.7V. If still no problems found, measure from CPU DM_CS at SMOC Pin2. If ok replace U220.
- If Main VCO is missing but modulation is fine remove SH07 and check discretes, SF_VCC U220 Pin23 and Main VCO tuning voltage U220 Pin21.
- If both Main VCO and modulation are missing then check the collectors of Q221 and Q222 for 2.7V. If ok, then check from CPU DM_CS at SMOC Pin2. Possible GIF SYN or SMOC problem.
- If TX is generated but is low then we look for problems under SH02 and SH09 and follow path through to antenna.
- If TX looks OK but fails in wingate check at the T/R switching circuitry (U401/U403) switching RF to J600 Pin2 and the J600 connector itself.

REVISIONS

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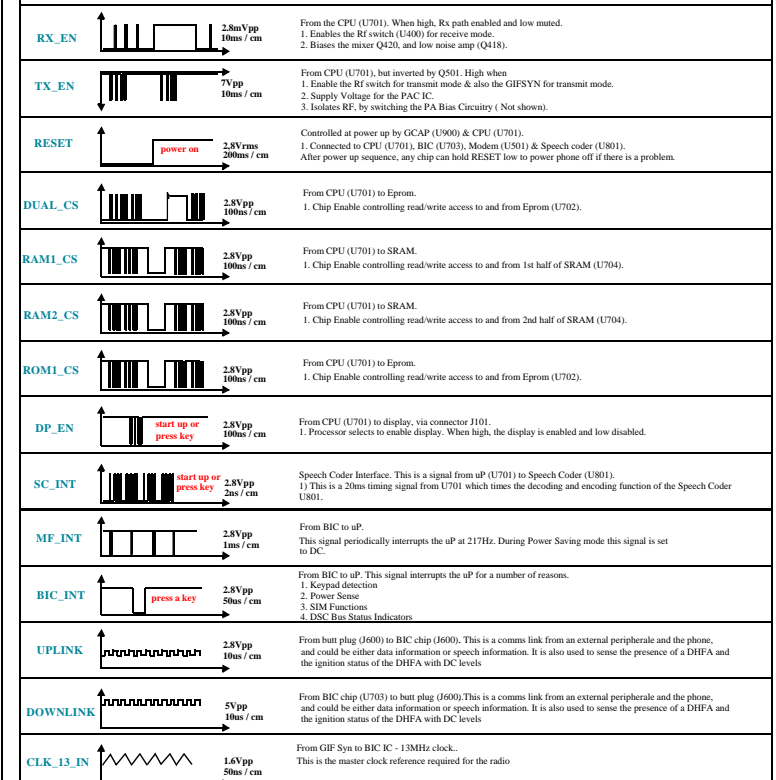
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DUAL BAND ZAP AUDIO LOGIC BLOCK DIAGRAM

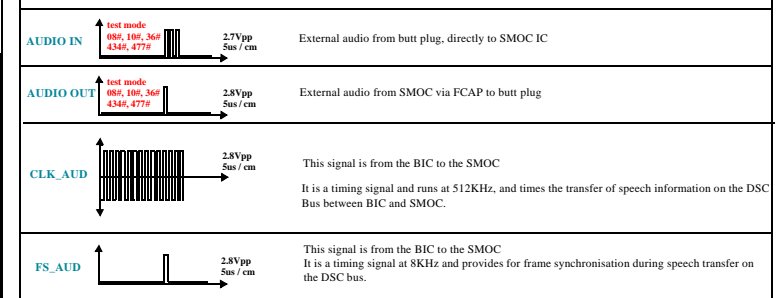


LOGIC BOARD SIGNALS

Measured in standby mode



Measured in test mode



AL LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
Alert	Alert	5009005J03	Q601	Power Transistor Charging	4809579E04
BT700	Connector Real Time Clock	0909888M01	Q602	Transistor Battery Feedback	4809939C05
CR607	Diode Charge Line	4809606E07	R602	Resistor I Sense	0680195M64
CR910	Diode Switched Supply	4809653F02	U500	SMOC IC	5199332C04
J500	Keyboard Connector	2809424M01	U703	BIC IC	5109962C11
J600	Connector-Extern	0909449B03	U900	GCAP	5109632D75
J603	Connector Vibra	0909888M01	U980	Voice Annotation IC	5109152M07
J802	Connector Microphone	0909195E01	U982	Amplifier IC	5109731C03
J803	Connector Speaker	0909888M04	SH11	Shield Call Processor	2609482M01
J900	SIM Connector	3909426M01	SH12	Shield GCAP	2609481M01
LS802	Speaker	5009076E12	SH13	Shield SMOC	2609483M01
Mic	Microphone	5009536H15	SH14	Shield BIC / EEPROM	2609484M01
Q501	Transistor TX_EN	4809607E05			

TEST COMMANDS

#	press 2 sec.
01 #	Enter Manual Test Mode
07 #	Exit Manual Test Mode
08 #	Mute Rx Audio Path
09 #	Unmute Rx Audio Path
10 #	Mute Tx Audio Path
11xxxx #	Unmute Tx Audio Path
12xxx #	Program Main Local Osc. to Channelbb
19 #	Set Tx Power level to fixed value
20 #	Display SW Version Number of Call Processor
22 #	Display SW Version Number of Modem
25 #	Display SW Version Number of Speech Coder
26xxxx #	Set Continuous AGC
31x #	Set Continuous AFC
33xxxx #	Initiate Pseudo-Random Sequence with Midamble
36 #	Synchronize to BCH Carrier
37 #	Initiate Acoustic Loopback
45xxxx #	Stop Test
46 #	Serving Cell Power Level
47x #	Display Current Value of AFC DAC
58 / xxxxxx #	Set Audio Volume
59 / xxx #	Display / Modify Security Code
60 #	Display / Modify Lock Code
7100 #	Display IMEI
	Display Error Code

POWER UP DEBUG

- Tie watchdog as shown in Signal Flow diagram, and supply power to radio.
- Check that there is B+ present at input to GCAP on pin 40. If not, could be problem with Battery Select Circuitry (Q906).
- GCAP should then drive R275, L275 and VRef. If these are not present, could be a problem with GCAP itself.
- Verify collectors of regulators Q221 and Q222 are both around 2.75V.
- If ok, then check that the SMOC drives the Xtal Varactor Diode CR201 on the AFC line with a DC Voltage.
- If ok, then follow 13MHz path through GIF SYN & BIC and then to Call Processor and SMOC.
- If ok, then check chip enables from Eprom, and SRams at Test Points.
- If ok, then verify Reset Line.

COMMON PROBLEMS

Customer complaints Special Note	Part	Part / Prefix	Reason
1. NO PWR UP	SRAM	U702	bad soldering / defective
2. NO PWR UP	EPROM	U704	bad soldering / defective
3. TX PROBLEM (PWR DWN)	PA	U301	defective
4. PWR DWN	CAPACITY	C330	defective
5. NO CHARGING	RESISTOR	R602	broken
6. TX / RX FEHLER	GIF_SYN	U220	defective
7. NO PWR UP	GCAP	U900	defective
8. NO DISPLAY / NO PWR UP	DISPLAY BOARD	DISPLAY BOARD	defective
9. PX PROBLEM	FILTER	FL480	defective
10. NO BATT CONTACT	BACKHOUSING	BACKHOUSING	broken

REVISIONS

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Dual Band ZAP

LEVEL 4 - Training



Contents

- Variants
- Disassembly
- Mechanical Parts and Design Review
- Electrical Parts and Design Review
- Accessories



Variants

Stage 1: (CD 920)

Test market launch - Black flipped variant only - standard display.

Stage2: (CD 920) four weeks after Stage 1

Worldwide launch of fully featured flipped variant, three different colours (Black, Steel Gray and Pin Blue).

Stage 3: (CD 920 and CD930) four weeks after stage2

Worldwide launch of fully featured flipless variant, three different colours (Black, Steel Gray and Pin Blue), holographic display.



Disassembly for ZAP



1. Remove Battery door by pressing down on latch and pulling.



2. Remove the Battery by pushing from the bottom and lifting upwards.



Disassembly for ZAP



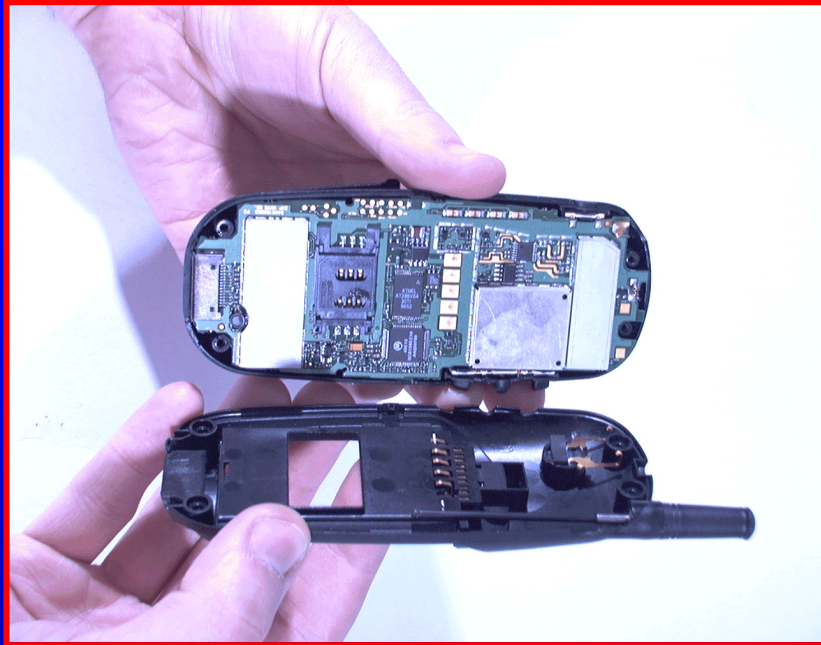
3. Remove 4 screws with torque 7



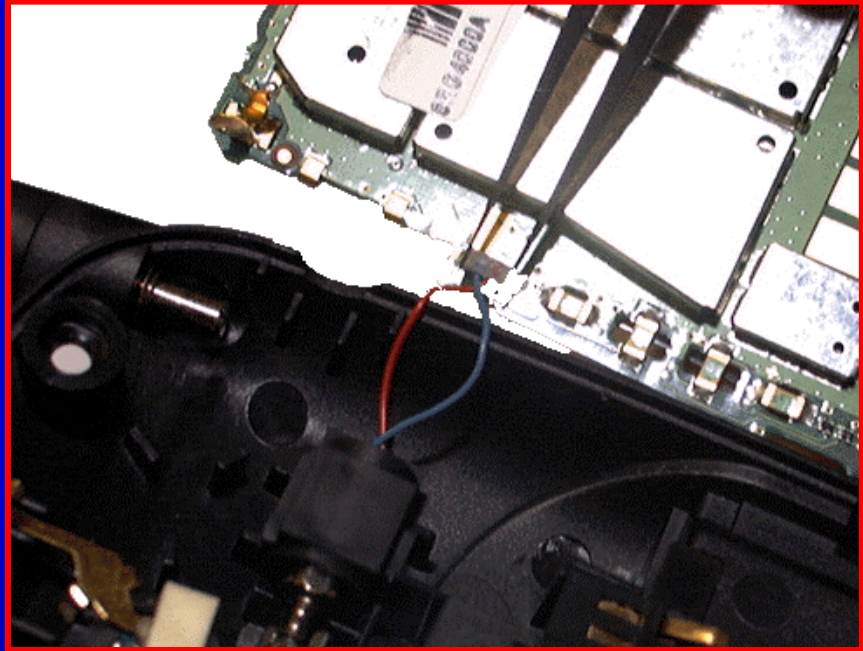
4. Unscrew antenna and remove



Disassembly for ZAP



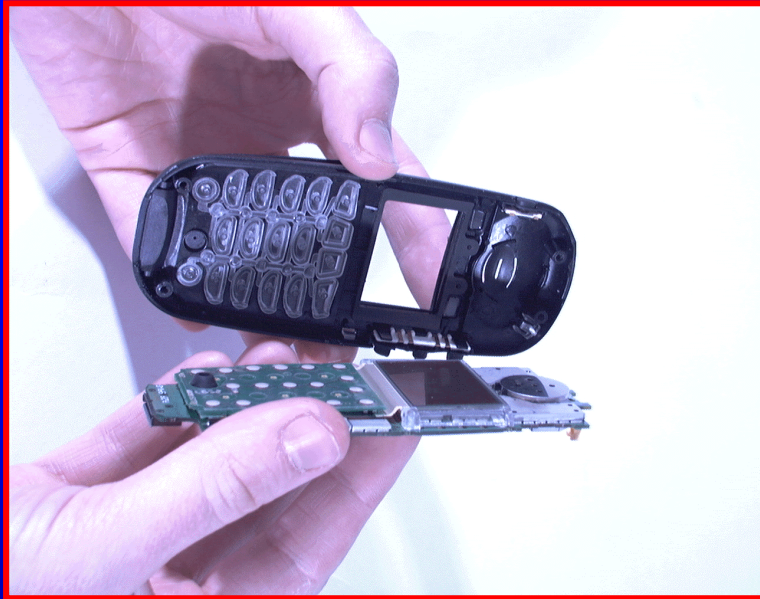
5. Remove with care the Backhousing from Unit



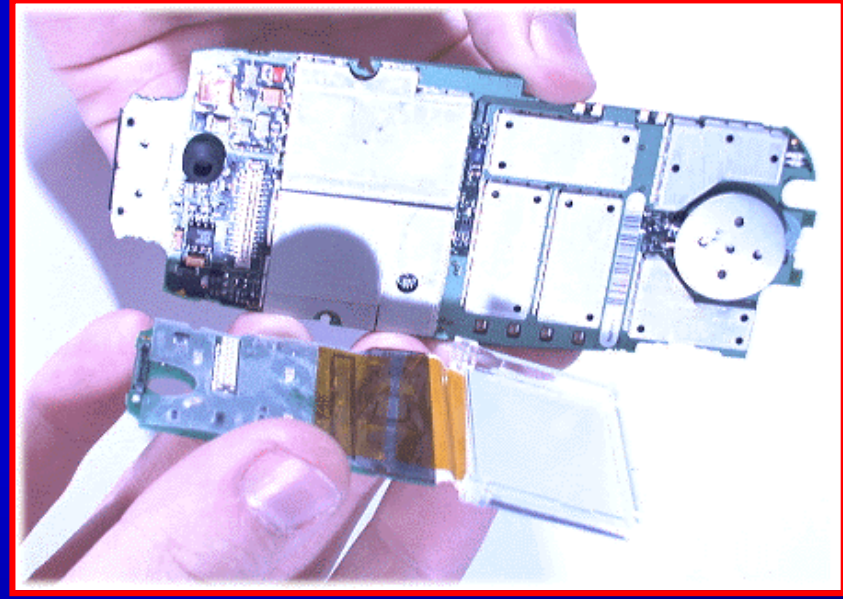
6. Remove vibrator connector from PCB with tweezers



Disassembly for ZAP



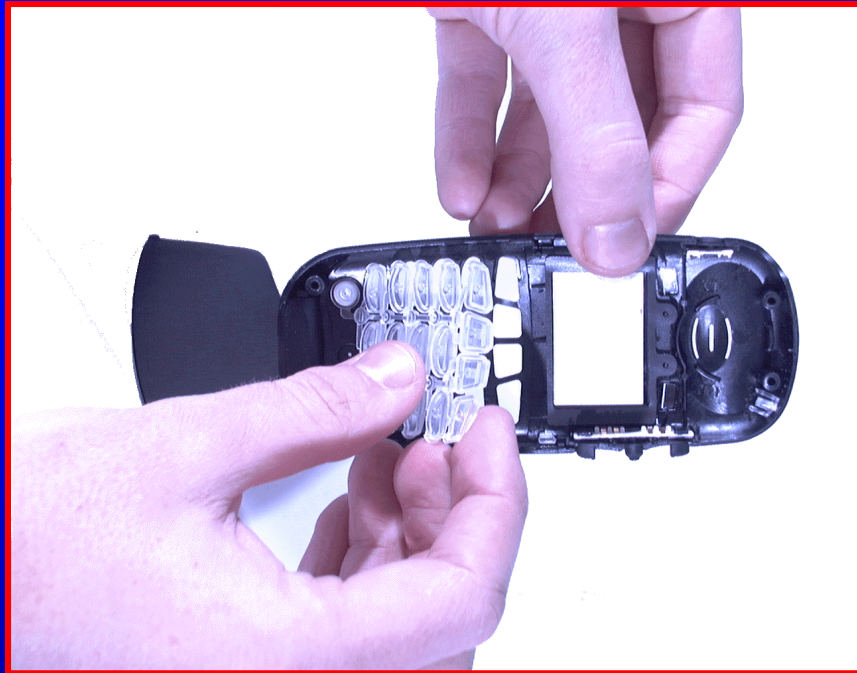
7. Detach PCB from front housing



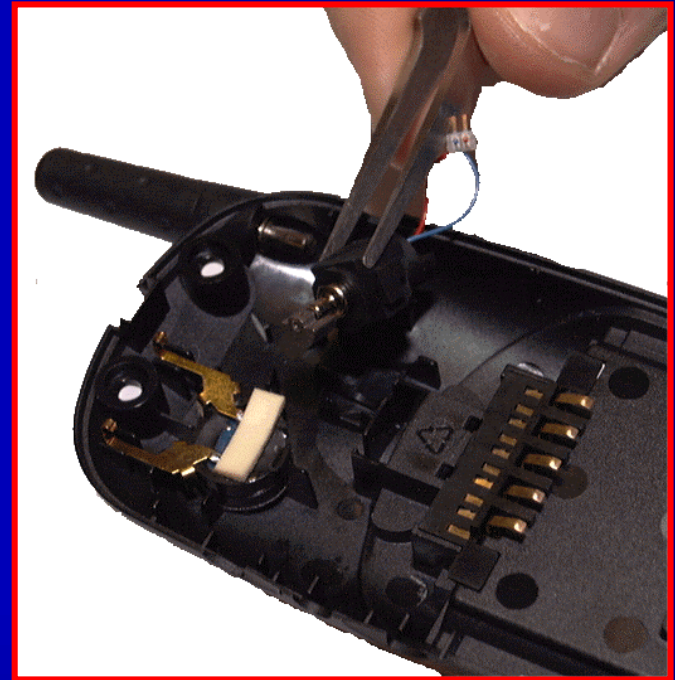
8. Remove display board from PCB



Disassembly for ZAP



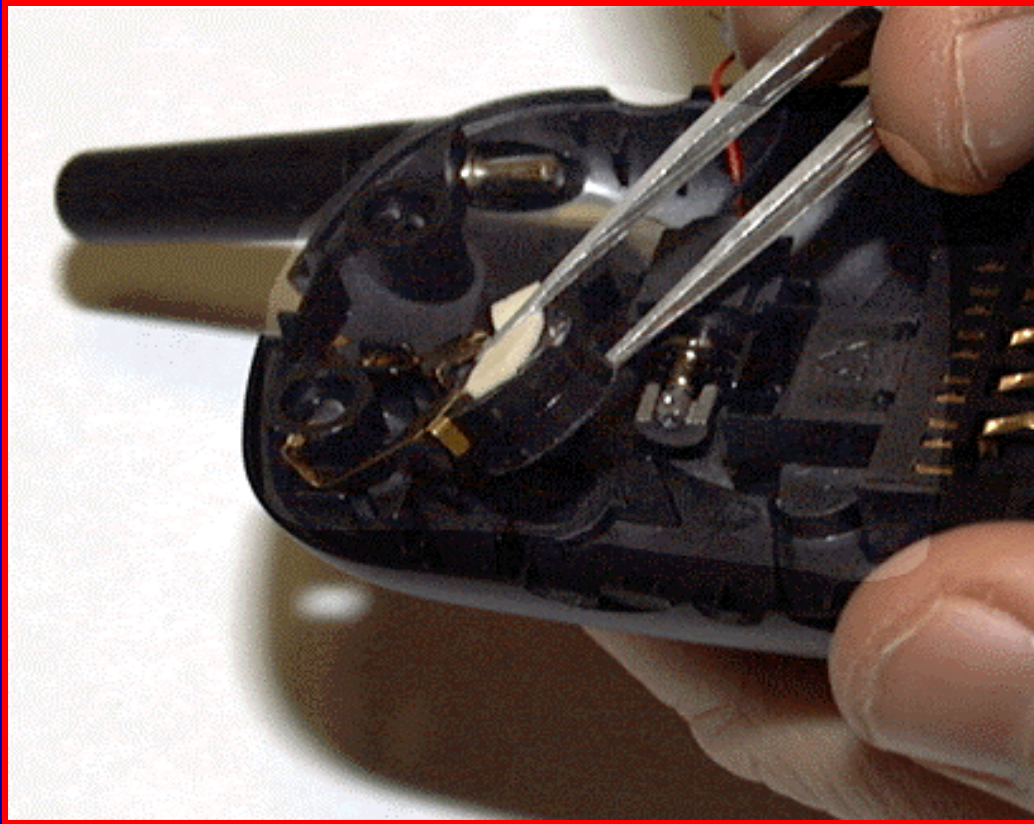
9. Remove Keypad from front housing



10. Remove vibrator from back housing



Disassembly for ZAP

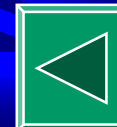


11. Prise alert from back housing by placing tweezers under

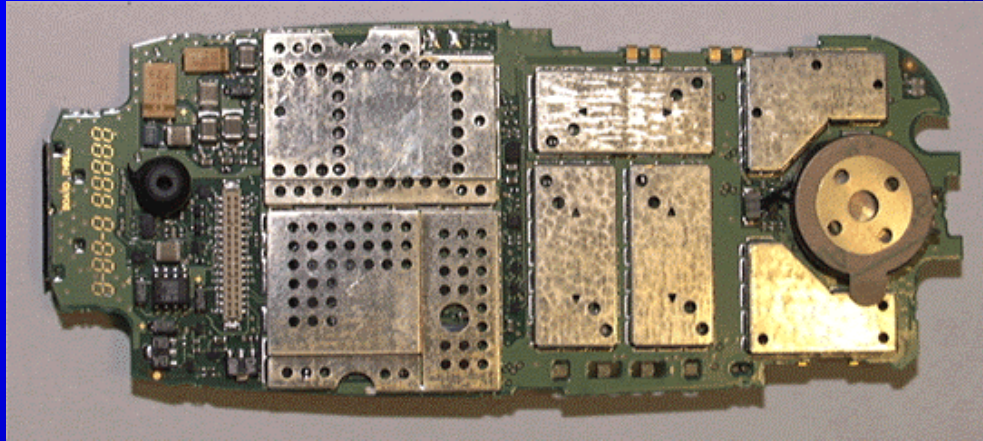


Mechanical Overview - Dual Band

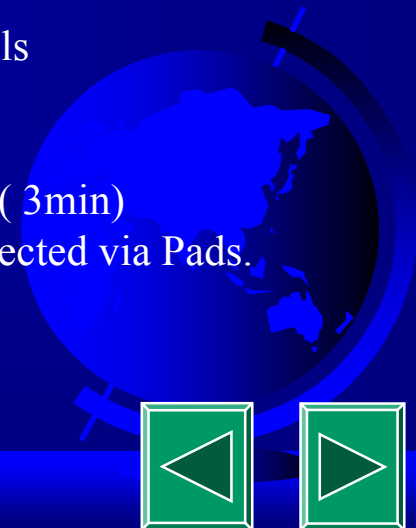
- ♦ Mid Tier Product - Desktop charger, 4 Line Graphic Display, Data transfer possible.
- ♦ Flipped and non flipped Version
- ♦ 3 Cell Battery Used .
- ♦ Battery Door on Backhousing.
- ♦ Transceiver and Keyboard are separate PCBs.
- ♦ Wiring for vibrator only.
- ♦ No wiring for Speaker, Alert and Mic - Contact Pads and connectors only.
- ♦ Off the shelf screw in Antenna
- ♦ Plastics have no shielding, so Logic is shielded as well as RF.
- ♦ No moon tyres or ground clips needed
- ♦ No Peel off cans like in Modulus used.
- ♦ Uses mini SIM with SIM Enabling Circuit.
- ♦ Auxilliary RF via Batt Plug Connector J600.
- ♦ Housings Screwed instead of being clipped.



Electrical Overview



- 2.7V Chipset Technology as in 8700 / Modulus.
- Use BGA and uBJA Technologie. (Call Processor, SRAM, EPROM)
- Use SMOC IC. (Speech Modem Chip)
- GCAP used (Global Control Audio Power IC)
- Clock Modulation Circuit used to improve interference on certain channels
- E P Battery Charger like in StarTac.
- SIM Enabling Circuit Required as phone has no Presence Detect switch.
- Use Voice Annotation IC for recording receiving Audio and Voice Notes (3min)
- Use Interface Board for Volume/Mute and Voice Annotation Button connected via Pads.
- Real Time Clock only supplied by battery on top the Shields.

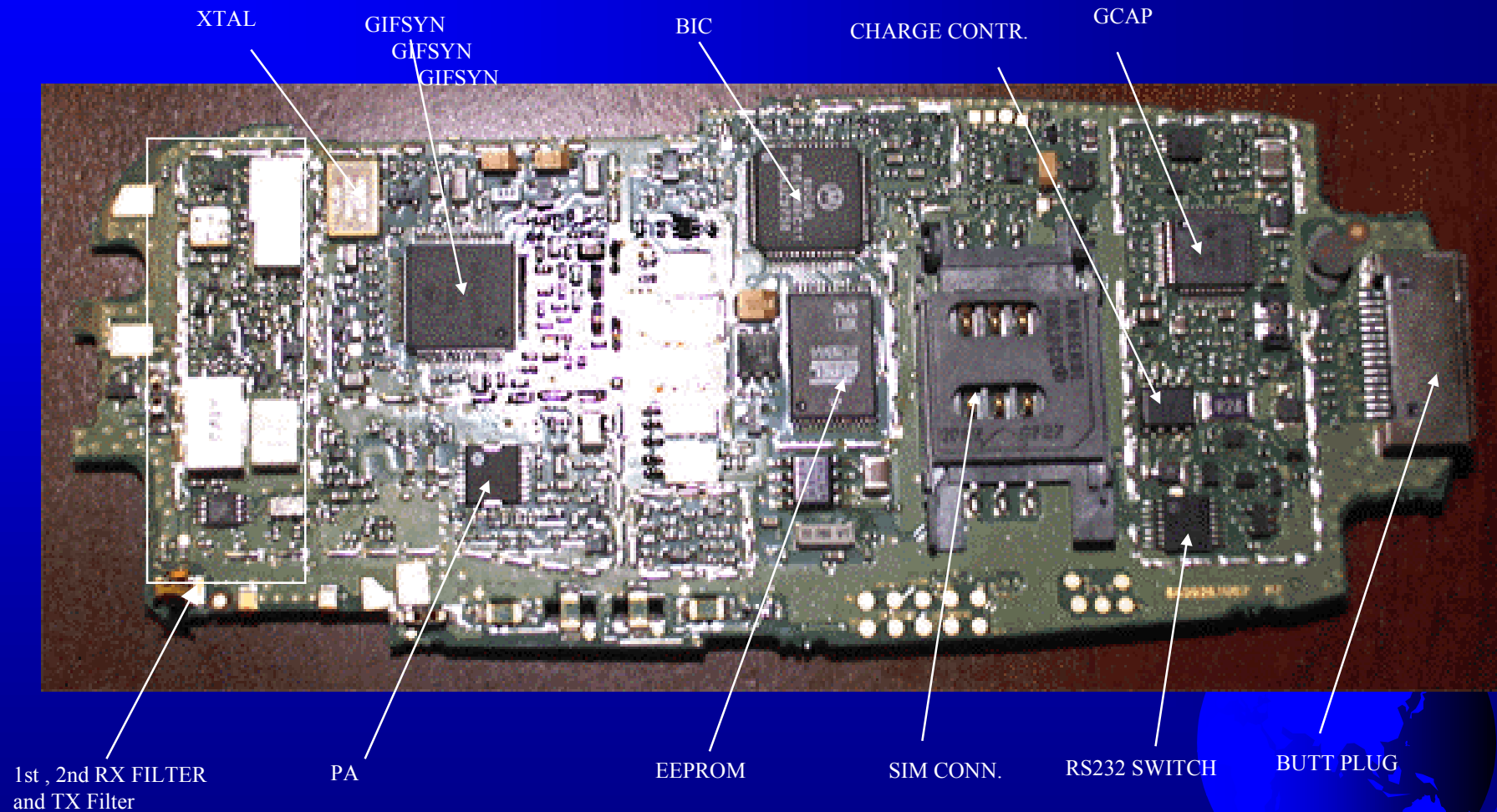


Frequencies

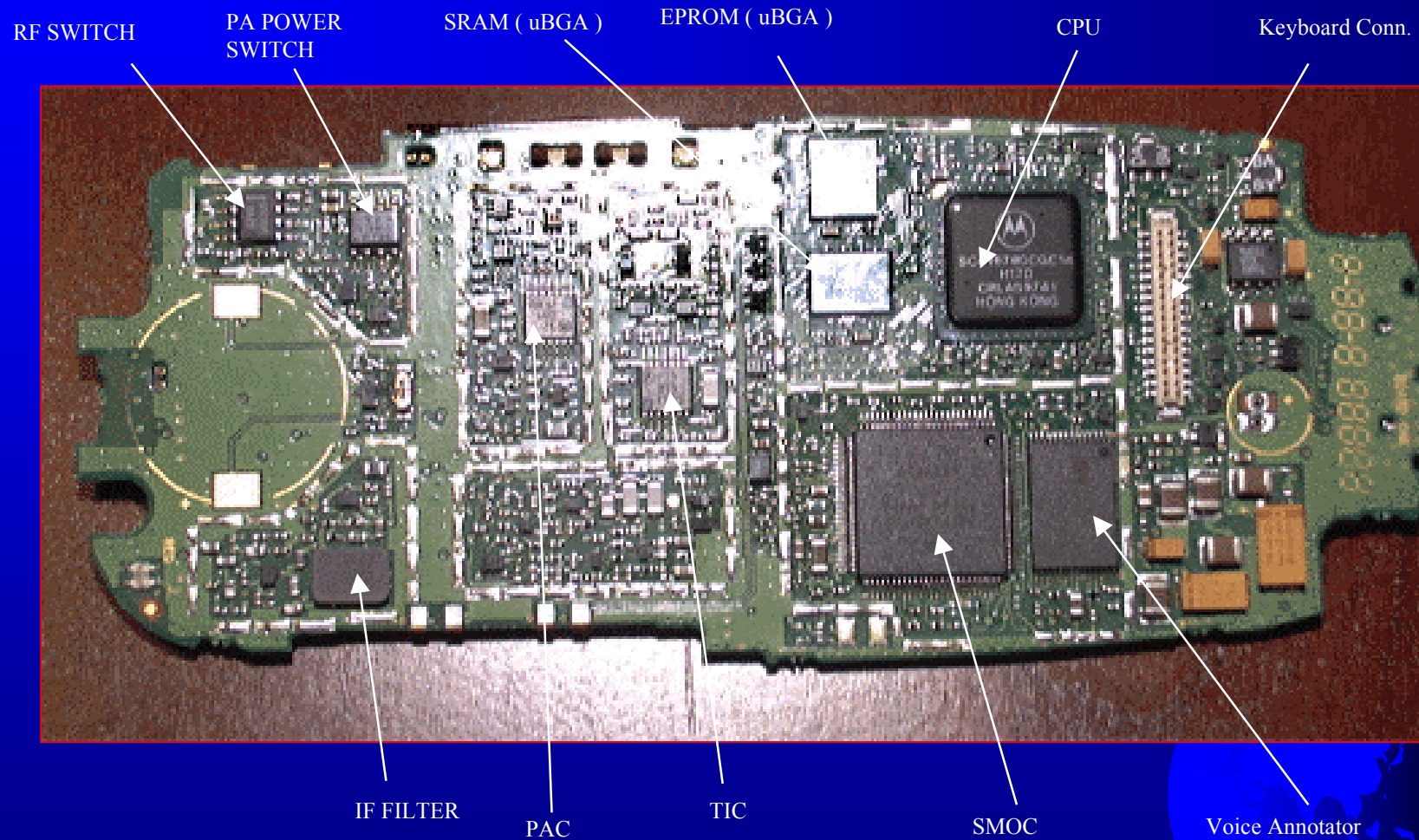
GSM / CHANNEL	Tx	Rx	MAIN VCO	Rx I.F	Rx IF LO	Tx I.F	Tx IF LO
1-Low	890.2	935.2	782.2	215	430	170	340
62-Middle	902.4	947.4	794.4	215	430	170	340
124-High	914.8	959.8	806.8	215	430	170	340
DCS / CHANNEL	Tx	Rx	MAIN VCO	Rx I.F	Rx IF LO	Tx I.F	Tx IF LO
512-Low	1710	1805	1590	215	430	120	240
700-Middle	1747,8	1842,8	1627,8	215	430	120	240
885-High	1785	1880	1665	215	430	120	240



Electrical Overview Bottomside



Electrical Overview Topside

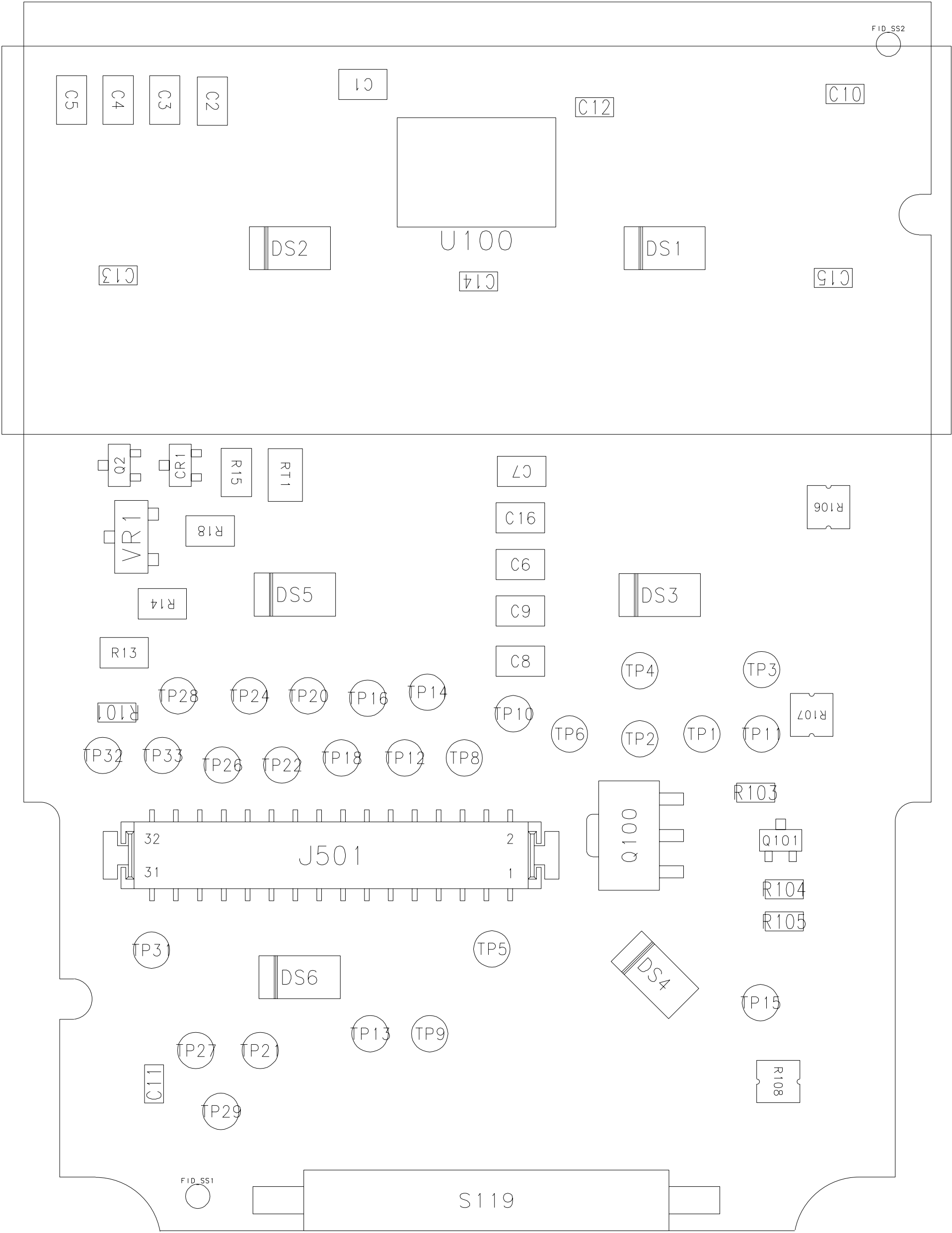


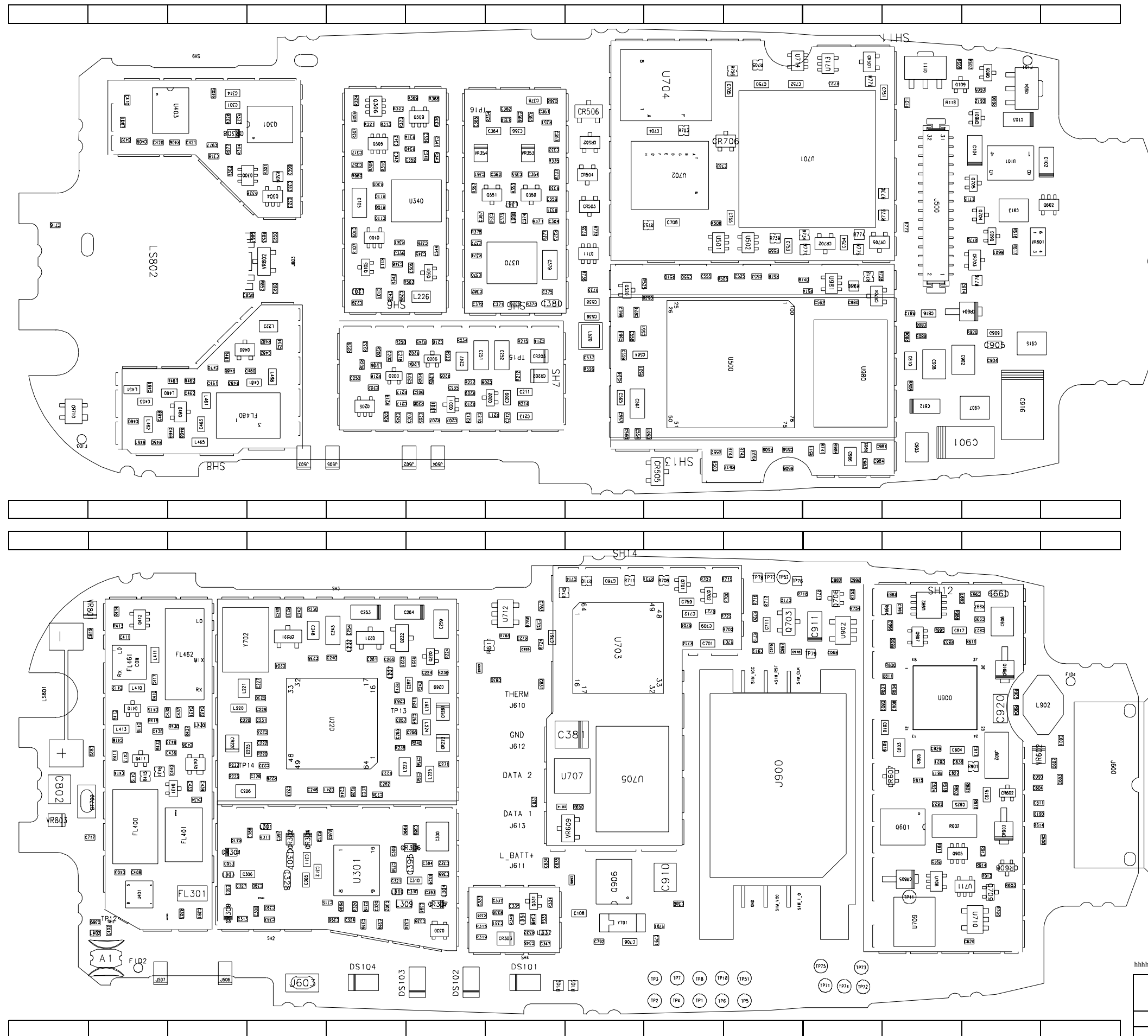
Accessories

1. Universal Rapid Travel Charger
2. Desktop Charger with separate battery slot.
3. Cigarette Lighter Adapter
4. Headset (Personal Handsfree System)
5. Hang Up Cup
6. Plastic Holster
7. Leather Holster
8. Professional Hands Free Kit - with DSP - without HS
9. Professional Hands Free Kit - with DSP - and Voice Recognition



SCALE 4:1 13-NOV-97
ZAP KEYPAD\DISPLAY BD.
84-09411M05 PE





EUROPE MIDDLE EAST & AFRICA	11.05.98
CUSTOMER SERVICES	
LEVEL 3 COLOUR SIGNAL FLOW	Rev. 1.0
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MOTOROLA CONFIDENTIAL PROPRIETRY INFORMATION

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ZAP ANALYSIS OVERVIEW



Contents

1)	Product Strategy/Target Markets.	Page 4.
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Section 1



Product Strategy

The demand for a Dual Band phone in a fresh, new design is critical in competing with new product offerings by the competition. The Zap product is a SMOc- based, band aware, and targeted toward mid to high tier business users. It will replace the 8000 series product line, which includes a SmoC - based 8700, SmoC-based 8700 with Voice Annotator, and a band aware version (8900).

Zap will incorporate the latest in feature offerings including HDML, multi-rate speech coder, one-touch voice memo recording, and offer market leading talk and stand-by times. A full line of accessories will be developed to support Zap including DHFA with Voice Recognition, headset with mic, desktop charger, and data cable which eliminates the need for a PCMCIA card. Several different batteries will be available, allowing the user to either minimize weight, or maximize performance.

To fully capitalize on Motorola's leadership in band aware technology, Zap must be introduced no later than Q4 1997. Dancall and Ericsson, among others, have announced their intentions of new product offerings in this category. Aggressive ramp schedules must be met to achieve a Europe-wide launch in December 1997.

Target Markets

The target market for Zap will be mid to high tier business, with emphasis on the focused and balanced business user segments.

Focused Business: These are the heaviest users, and are prone to use the phone for business only. Viewing the phone as an absolute necessity, the focused business user is able to carry out professional responsibilities efficiently and tirelessly. Mainly travelling to dense urban environments, call success rate is extremely important to this segment.

Balanced Business: The balanced business user primarily uses the phone for business related activities, but has also integrated its use into personal life. Characterized by working the longest hours and travelling the most, these users primarily depend on performance.



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Section 2



History so far

The Zap radio is a band aware product that was developed for use in areas where both GSM and DCS systems are in existence.

The Zap dates back to December of 1996 when development initially took the GSM 8800 circuitry and modified it to what we currently know as Zap. The Zap is smaller and lighter than GSM 8800 and from a mechanical viewpoint, it is a derivation of the GSM/DCS Modulus product line.

The radio is very easy to assemble and not as sensitive to operator issues as the Clam Rae product.

The first proto run was performed in July 1997 in the Advanced Realization Centre. In August 1997, the first proto run in the European Subscriber Division was realised. At that time, they were using blank Flash IC's which had to go through boot-code before going to tuning. Later builds had the EPROM pre-programmed when placed on the board, so it was not necessary for the boards to go through boot-code.

In Libertyville Tech-ops are currently working on a testbay setup where the unit under test will go through boot-code just prior to being tuned. This is a setup that is currently being employed at Easter Inch with great success.

Flensburg have planned to start production of Zap for early 1998 and are currently doing proto runs of approximately 50 - 100 units. There is poor availability of Sram's and PA's which is limiting the amount of radios built during these proto stages.

Easter Inch are planning to do a proto run sometime between weeks 48 & 52, hopefully week 48 but more realistically week 49, with a plan to start full scale production Feb. 1998.



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Section 3



Brief Description

Zap is the latest look in the evolving MOTOROLA MicroTAC Flip phones. It is being developed for GSM/DCS systems worldwide.

The RF portion of Zap is capable of being modified for operation on EGSM frequencies.

A single phone will work on GSM 900 and DCS 1800 Bands. It provides the service provider the ability to better manage congestion by transferring traffic over to the other less congested system. The user has the advantage of being able to roam into either one of the systems that is available.

The transceiver board and keypad/display board are mated by a 32 pin connector. The transceiver board being made up of 6 layers.

The phone utilises a real time clock, internal fast charger, a 32 x 96 graphics display, Personality software, smart button, voice annotator and also accommodates a small SIM card.

The Zap will also support the RAE universal transformer and CLA. The RAE desktop charger will be modified to fit the ZAP form factor.

Marketing has requested new accessories which include a boom headset, data cable, smart card reader, and three new car kits.

The ZAP will utilise the butt plug and one battery as power source options. Support for alkaline AA batteries is also being investigated.

The Zap also incorporates the SMOIC IC which is a composition of Speech Coder, Modem and Codec. This component is found on various other products for example 8700 and Modulus.

The Zap also uses 3 BGA's (Ball Grid Array):-

- 68338 uP (BGA)
- Flash EPROM (uBGA)
- SRAM (uBGA)

The transceiver board is almost entirely covered with cans similar to Modulus but are solid with a few holes placed to aid can removal.

The receiver and transmitter are very similar to bandaware but the switching network is simpler and more integrated.

The Zap will be the first MOTOROLA digital phone to utilize a voice annotator.



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Section 4



Preliminary Design/Dimensions

Physical Characteristics:

Transceiver weight = 98g
Volume (with slim battery door) = 135cc
Lightest/smallest config. (LP4 battery) = 120g
Length = 130mm
Width = 55.25mm
Depth = 26.95mm

Electrical Design:

Zap utilizes a 2.7V platform, Rae style connector, 3.6V battery support, and the latest components to minimize both Tx and Rx current drain. A BIC 4.2 is required to support recognition of a small SIM and smart card. NiMH, Lilon and alkaline technologies will be supported.

Front Housing:

The front housing design includes an earpiece, and allows the use of a lens and 18-key keypad. Three side buttons are utilized on the left side, functioning as up and down scroll, and smart key (similar to StarTAC). One right side button will serve as the dedicated voice memo record button. A microphone port is located bottom centre left, with two other styling ports for symmetry. A protective ridge is used around the power key to avoid inadvertent operation.

Rear Housing:

The rear housing is cut away at the bottom to utilize a battery door concept. An escutcheon at the top of the rear housing makes visible the Motorola brand name while the phone is in use and covers two assembly screws. A call alert port is positioned below the escutcheon and to the right.

Battery door:

Zap uses a battery door concept. Three doors will exist; a slim door which will house the LP4, AAA Longs and LSQ8 batteries, a slightly larger door will cover the AA batteries and a door large enough to cover two LP13 batteries. The doors will be completely removable, and will mount to the rear housing by placing the heel of the door into a guide and rotating down until it snaps to the back housing. The doors will be the same colour and texture of the front and rear housing.

Display/Indicators:

The display consists of a 96 x 32 pixel LCD module, with full graphics support and icons. Utilizing the same pixel density of StarTAC and 8700, the display size is slightly smaller, measuring 34mm by 23mm. The display icons are arranged in two rows, located at the top of the display.

Top row: signal strength indicator, real time clock, battery charge indicator

Bottom row: off-hook, roam, home, voicemail message, SMS, ringer-on

The top row will be continuously on, while the illumination of the bottom row icons will depend on the specific operating conditions. New with Zap, the ringer on icon will be illuminated when the ring alert has been selected. The icon will not be visible when either vibracall or silent alert has been activated.

Lens:

The lens is curved to follow the contour of the front housing. Motorola branding is positioned at the top of the lens. The lens has a glossy finish, and has the same colour as the housing.

Flip:

For the flip version of Zap, the flip is designed to fully cover the keypad. The top edge of the flip will coincide with the lens. A cam mechanism is utilized. Clicking must not be audible when operating the flip, and the design must give a sturdy, unbreakable perception. The flip has an escutcheon pocket positioned at the top.

Keypad:

The keypad consists of 18 keys. A domed plastic key is used to enhance tactile feel. The keypad layout is as follows:-

Quick Access	MENU	C	OK
1	2 ABC		3 DEF
4 GHI	5 JKL		6 MNO
7 PQRS	8 TUV		9 WXYZ
*	0 +		#
Power Icon			M+

The key colours are as follows; Background (except power key)- black. Digits, Alpha, MENU, M+ - white. C - red. OK - green. Power - white background with black icon

External Keys:

Three side keys are used on the left side of the phone. The top and bottom keys scroll through menus and phone book entries, while the middle key functions as a smart key (similar to StarTAC). The middle key is oval and domed with moulded diamond icon. The scroll keys are domed, half oval with moulded up and down indicators.

One key is present on the right side, just under the antenna, for dedicated voice memo recording. The key is "flush to below" the housing to prevent inadvertent operation.

All external keys are made of soft silicon rubber and are process black.

Earpiece:

The earpiece is a recessed oval with the middle detail slightly raised with a slot pattern to accommodate the dynamic speaker. The actual slot design allows sufficient air movement to maximize audio clarity. This slotting was determined by engineering to achieve best results.

SIM Card:

Zap uses a small SIM design. It is positioned in the back housing, under the battery. A sliding, flip up door configuration is used to allow for easy insertion/removal.

Batteries:

Shrink wrapped, 3.6V batteries are used for Zap. In addition to cost effectiveness, this design allows minimal product thickness. Lithium Ion, Nickel Metal Hydride and Alkaline batteries are supported. Because of the huge variation in performance when using alkaline batteries, these batteries are promoted as "emergency use only". Average talk and stand-by times should not be associated with alkaline batteries. Five battery configurations will be available:

1. LP4 (Li Ion, 500 mah) \$56
2. AAA Long (NiMH, 700 mah) \$9
3. LSQ8 (Li Ion, 900 mah) \$21
4. AA (NiMH, 1500 mah) \$13
5. Double LP13 (Li Ion, 2600 mah) \$100
6. AA Alkaline (emergency use only)

LED Indicator:

A status LED indicator is positioned at the top left of the phone, towards the front. This indicator has similar functions as the one used on StarTAC: green will flash when phone is on and in service, red when the phone is on and out of service, and orange when the user is in roam.

Antenna:

The antenna must support both 900 and 1800Mhz frequencies. Both the stub and pull out style antennas were evaluated with regards to signal performance and the tendency is leaning towards using the stub antenna.

Voice Annotator:

Zap supports the voice annotator feature, allowing at least 3 minutes of multiple messages with store and erase capability. To maintain consistency with the 8700 memo product, hands free operation must be available when using the voice annotator with a car kit.

Key/Unique Features

Automatic Band Switching:

As the majority of the market will be moving towards dual band capability, Zap will be positioned as a high performance, band aware offering in a new, ergonomic design.

HDML support:

To carry internet access into the cell phone arena, **Unwired Planet** has agreed to support our efforts in integrating this feature into Zap.

Performance:

Targeted toward the mid to high tier business user, performance is critical. Zap will take a leadership position with the Extra Performance package, offering stand-by time of over 2 weeks.

Smart Card support:

eCash and paperless ticketing are two examples of smart card applications. Through a smart card accessory, Zap will offer smart card support, allowing the user access to the variety of other potential applications.

Multi Rate speech coder:

Now becoming a competitive necessity, Zap will offer excellent audio quality through this feature.

SIM Tool Kit:

A competitive necessity, this will allow operators to customize their software load according to their needs.

Form Factor:

In several user surveys focusing on design, the Zap form factor has repeatedly ranked among the highest. Test subjects indicated the phone was very comfortable to hold, looked expensive, and appeared like it was easy to use.

Data Compatibility:

With the data cable accessory, Zap will support:

1. Data: 9600 baud, transparent and non-transparent, AT and V.25 bis command operation. V.42 bis compression/decompression is supported.
2. Fax: 9600 baud, transparent and non-transparent, EIA/TIA class 1, 2, and 2.0 AT command operation.

Software and MMI description:

Zap uses the personality II interface, however scrolling through menus is accomplished by using the up and down side buttons. As with current products, User Configurable Quick Access is supported. The Smart button functions identical to StarTAC 110. The dedicated voice annotator key functions the same as it did on 8700 memo product (multiple messages totalling 3 minutes), including instant recording by pressing the dedicated button.



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Section 5



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Rx Path Brief Description

- * As the Zap product is bandaware there are two RF paths to follow GSM and DCS the following deals primarily with GSM and has the equivalent DCS parts in **Bold** type.
- * The RF Signal enters the Radio via the antenna, then passes through the RF switch, depending on the switching signals present at the switch network of U401 and U403.
- * From the RF switch the signal then passes through FL400/**FL401** which are bandpass filters where it is cleaned up before being passed onto C413/**C433** (de-coupling capacitors).
- * The signal is then passed onto the base of Q410/**Q430** (low noise amplifiers), where it gains small amplification.
- * The output of the LNA now passes through FL461/**FL462** which are combination bandpass filters with approximate losses of 3dbm across the filters.
- * The MAIN VCO signal also enters the filters (FL461/**FL462**) at this point and both signals are passed onto the Mixer Stage (Q460). The output of the mixer consists of 3 main components $F1 \times F2$, $F1 + F2$, $F1 - F2$. You will also find various harmonics at this point.

F1 = Rx signal
F2 = Main VCO signal
- * To remove the unwanted signals at the output of the mixer these signals are fed through a SAW filter (Surface Acoustic Wave) FL480 which only passes the difference of these two signals 215Mhz.
- * The signal then passes onto the Isolation Amplifier (Q480), which provides a little gain and also prevents feedback/noise from the GIF_SYN I.C. U220.
- * The now "cleaned" I.F. signal now enters U220 via pin 31 (pre_in) where it is mixed internal to U220 with a pure 215Mhz signal. The internal 215Mhz signal is derived from the 430Mhz L.O. which is divided by two internally, this again gives us the difference.
- * From the mixing of the two 215Mhz signals, of which one has modulated data (derived from the external RF Signal), we derive two signals the RxI and the RxQ which contain the Digital information.
- * This is further demodulated in the SMOc I.C. (U500) and provides serial data, which is then D/A converted, amplified by the G-Cap and presented to the speaker.



RF SWITCH

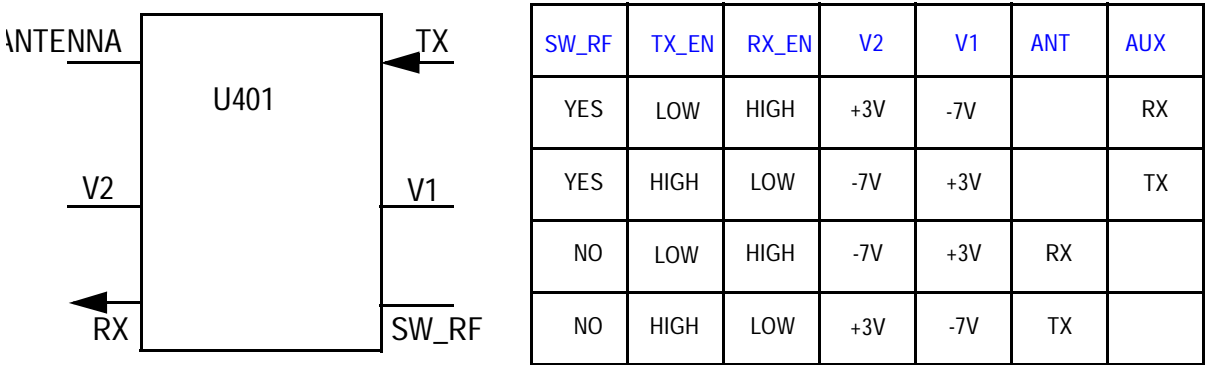
Circuit Description:

The RF switch has two basic functions. Firstly it prevents RF entering the Rx path when the unit is transmit mode. Secondly it switches the path for the RF signal from the antenna(A1) to the SW_RF connector (J600 pin2).

U403 is the logic switch that controls the state of U401 (RF switch).

When the radio is in a transmit state Tx_EN is high and Rx_EN is low therefore V1 is going to be high (+3V), V2 will therefore be low (-7V). The state of these two control signals will determine the path taken, in this case, RF will only pass through the antenna and not enter the receive path.
In receive mode the reverse will be true, and RF will be directed to the Rx path.

In the second case the circuit must be able to establish whether the antenna or the SW_RF connector is connected. This is done by sensing the impedance to ground(>10K) of the auxiliary RF connector. Switch U403 also detects the 50ohm resistance of the RF cable used when the SW_RF is connected, thus allowing antenna or AUX RF connection.



ZAP T/R SWITCH COMBINATIONS



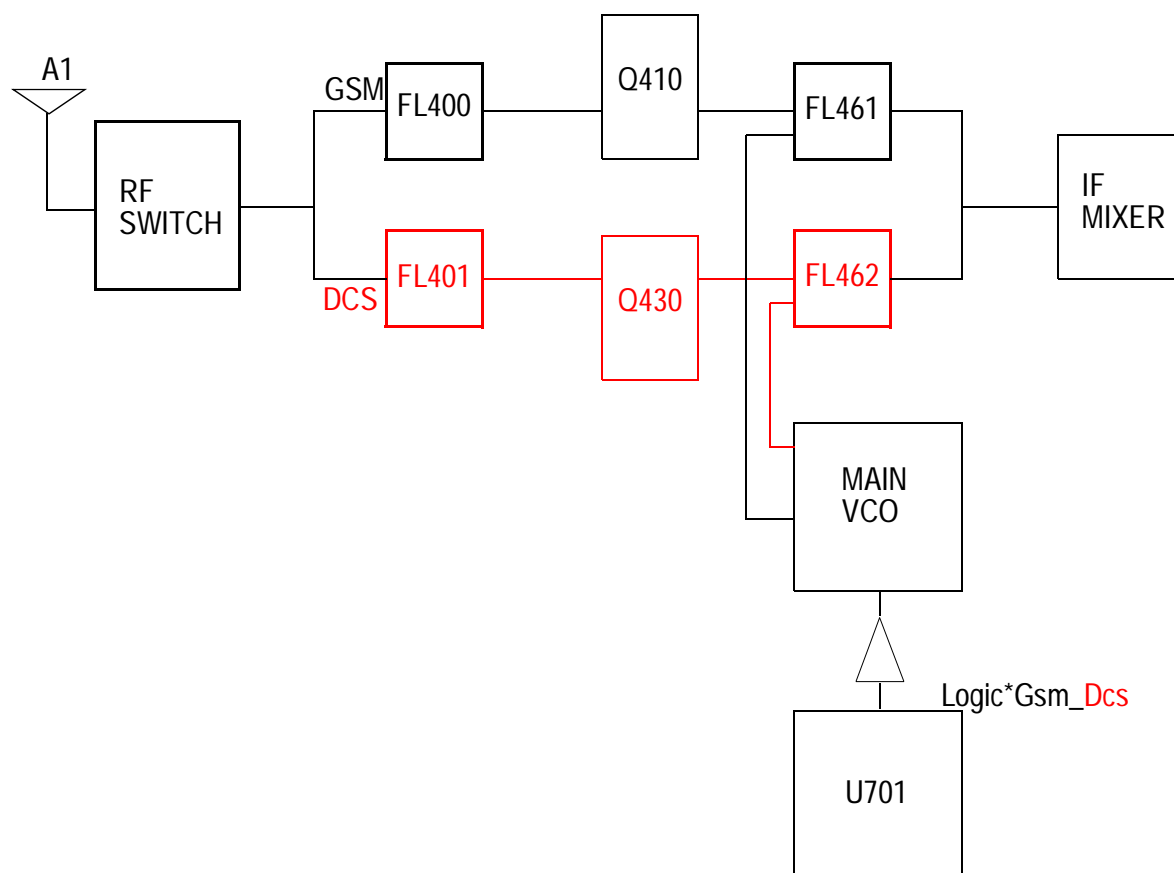
FROM RF SWITCH TO RECEIVER FRONT END

Circuit Description:

The RF signal enters the antenna(A1) and when the Rx_EN is high the signal passes through the RF switch to FL400/**FL401**, these are bandpass filters with pass bands of 935-960Mhz (BW=25Mhz) for GSM and **1805-1880Mhz for DCS (BW=75Mhz)** respectively both having approximately 3db loss.

The signal passes onto Q410/**Q430** which are low noise amplifiers with a typical gain of 13/**9.5dBm**. L410/**L430** are RF chokes to prevent AC getting to the DC bias voltage Rx275. Capacitors C413/**C433** and C412/**C432** are coupling capacitors and there purpose is to prevent DC bias voltage from Q410/**Q430** from reaching the other stages. Q410/**Q430** are enabled from Rx_EN via U701 pin A9 and LOGIC_GSM_*DCS from U701 pin B5 via Q412, which controls Q411/**Q431** hence de-activating either Q410 or **Q430**.

The signal then goes to a second filter FL461/**FL462** and then onto the mixer stage. In addition to the receive signal entering FL461/**FL462** the MAIN VCO signals for the particular band (GSM or **DCS**) enters at these Combination Filters.



RF SWITCH TO RECEIVER FRONT END BLOCK DIAGRAM



MAIN VCO/RX VCO

Circuit Description:

The main VCO is a 3V Dual Band design based on Knifewitch which consists of a colpitts oscillator(Q202), which operates from 720 to 745Mhz/**795 to 832.5Mhz** and is controlled by the GIF_SYN I.C. (U220, pin23). The output of the oscillator is supplied via a common base buffer(Q201) followed by separate 2nd stage common emitter buffers for GSM and DCS (Q206/**Q200**), and resistive splitters to drive the receiver front end, GIF_SYN prescaler and the TIC I.C. **The second buffer stage in DCS mode is used as a doubler (output frequency = 1590 - 1665Mhz)**. From there the signal goes through FL461/**FL462** to achieve the correct levels at the input to the mixer.

The tuning voltage representing the channel is output on MAIN_CP (U220 pin23) to the varactor diode CR202; **note that CR203 and associated components R215,R236 and C214 are in circuit for DCS mode when the correct condition is met via the *GSM_DCS line from Q100 & Q105**. The change in capacitance will control the frequency of oscillation. The higher the voltage the lower the capacitance and the higher the oscillating frequency.

The main VCO is adjusted by the RF_SPI and RF_SCK lines from the Call Processor to the SMoC I.C. and from the SMoC I.C. to the GIF_SYN and thereafter the MAIN CP is changed accordingly.

The supply for the main VCO is derived from pin 21 of U220 which is the SF_OUT. This supply is the super filtered supply to eliminate any noise generated. It is a 2.55V dc level.

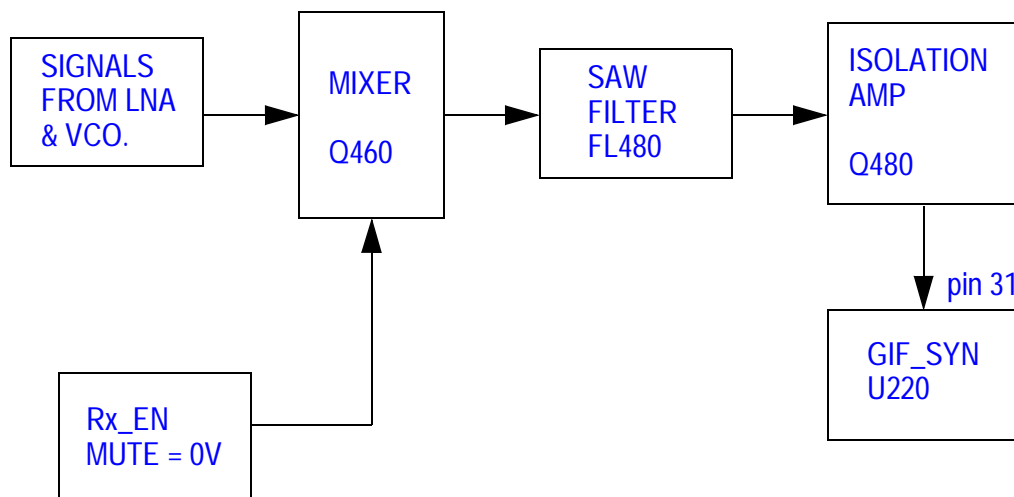


OUTPUT OF LNA TO GIF_SYN (U220)

Circuit Description:

The RF signal and the main VCO signal pass through the combination bandpass filters FL461/**FL462** (2.5dB loss) and are mixed in transistor Q460 (10dB gain). The output of the mixer will contain the original signals, their sum, difference, product and harmonics. The strongest signal will be the difference (215Mhz). The signal is then passed through FL480, which is a **Surface Acoustic Wave (SAW)** filter that passes only the 215Mhz signal with a bandwidth of 180Khz.

The signal then goes to the Isolation Amplifier (Q480), the bias of which is provided by SW_VCC and that is supplied by U220 pin 33. The IF signal from the Isolation Amplifier(10dB gain) then goes to pin 31 (PRE_IN) of U220. The purpose of the Isolation Amplifier is to isolate U220 from the receive path. It is used to decrease the reverse feedback of the 215Mhz local oscillator and step up the impedance to the IC. The use of this amplifier improves the noise figure performance, while providing an opportunity to compensate for gain variations in the rest of the receive path over temperature (AGC).



BLOCK DIAGRAM OF LNA TO GIF SYN.

Muting the receiver:

The Rx_EN is used to mute the receiver when Rx_EN is low. When it is high, the base of the mixer Q460 goes high and the amplifier is turned on. When it is low the base of the transistor goes low, and the amplifier is turned off, thus muting the receiver front end.



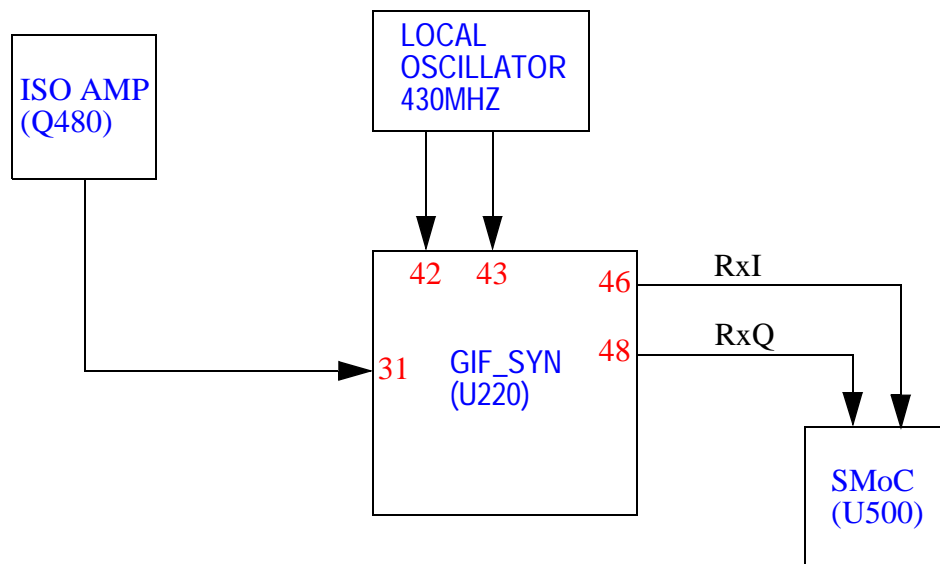
FROM MIXER TO GIF SYN(U220)

Circuit Description:

The 215Mhz IF goes into pin 31 of U220. In the GIF_SYN(U220) the signal passes a 25dB step attenuator (internal to U220) on its way to the Quadrature Demodulator. The step attenuator is designed to improve the range of the receiver, by keeping the RF signal in the range of the amplifier. i.e. When the signal is too strong the step attenuator will kick in and drop the signal by 25dB.

Inside the GIF_SYN the IF is mixed with the 430Mhz from the external tank circuit, (which is divided by two internal to U220), and demodulated to give two signals RxI and RxQ on pins 46 and 48 of U220. RxI and RxQ are Quadrature baseband analogue signals at 1vp-p on a 1.65v DC level. These two signals then go to the SMoC I.C. where they are further demodulated.

The signals RxI and RxQ then go to pins 23 and 22 respectively of the SMoC I.C.(U500). In the SMoC I.C. the I & Q signals are A/D converted and the digital data is transmitted serially to the Call Processor (U701) pin E1 (MISO). The SMoC I.C. also decodes and decompresses the signal before D/A conversion.



BLOCK DIAGRAM OF ISOLATION AMP TO SMoC.

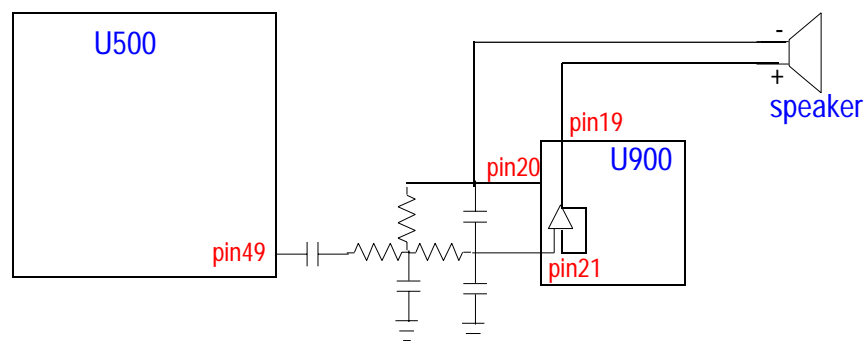


AUDIO PATH FROM SMoC TO SPEAKER

Circuit Description:

After being decoded from digital to analogue, the audio signal exits the SMoC (U500) at pin 49 (SPKR). Now named Rx_AUDIO, the signal travels via C825 and R810,R801 to the GCAP (U900) pin 21(SPKR IN). The signal is amplified internally by U900 and then output on U900 pins 19 and 20 (SPKR+ and SPKR -). The speaker is driven differentially and is connected via R852 (+) and R853 (-).

The audio tones which are heard when a key is pressed, are generated as digital signals within the U500 before being converted to analogue. The signal then follows the path described above.



BLOCK DIAGRAM OF AUDIO PATH FROM SMoC TO SPEAKER.

The internal amplifier of U900 is controlled by the Call Processor via the control ports at pins 57 & 60 of U500(AUD_EN2 & AUD_EN1) which go to U900 pins 44 & 45 respectively. To activate the internal mic and speaker amplifiers U701 drives AUD_EN1 low and AUD_EN2 high.



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Section 6



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Tx Path Brief Description

- * Audio from the microphone (analogue signal) is amplified by U900.
- * The signal is then A/D converted by the SMOc I.C.
- * The SMOc also adds error correction bits and encodes the signal, the data is then GMSK digitally modulated and then D/A converted.
- * See notes for GMSK modulation:
- * The modulated analogue signal is then sent to the GIF_SYN I.C. as inphase (I) and Quadrature (Q) components. These ride on a DC level.
- * The Q signal lags the I signal by 90 degrees.
- * These are then modulated onto a 170/**120**Mhz signal.
- * The 170/**120**Mhz signal then enters the TIC I.C.(U370) along with the main VCO. The TIC I.C.utilizes a phase lock loop configuration to modulate the TX_VCO (GSM/**DCS** = Q351/**Q350**).
- * The now modulated TX_VCO is then preamplified by the exciter.
- * The gain of the exciter is controlled by the PAC I.C. (U340).
- * This is then fed to a fixed gain Dual Pack PA amplifier and then output via an RF switch to the antenna.

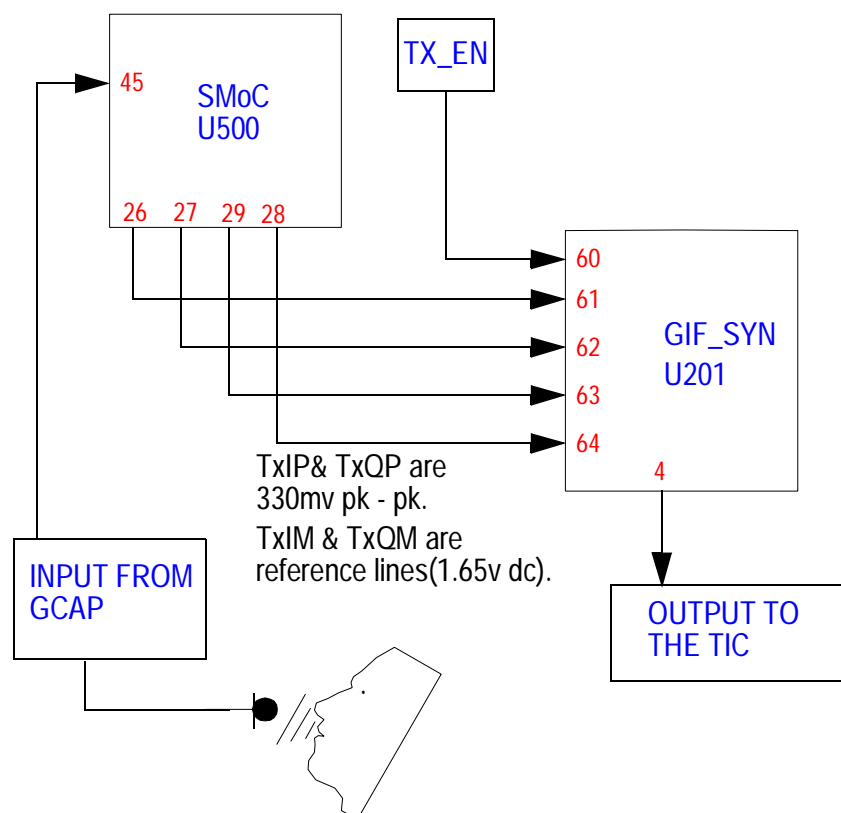


FROM MIC TO SMoC I.C.

Circuit Description:

Audio from the microphone enters the GCAP (U900) at pins 8 & 9(mic in +/-) where it is amplified and then output on pin 10 (micout). This signal then goes to the SMoC I.C. U500 (pin 45).

Inside the SMoC this signal is then A/D converted, error detection bits added and compressed. The resulting data stream is then GMSK digitally modulated, D/A converted and then filtered. This modulated analogue signal is then sent to the GIF_SYN U201 as inphase (I) and quadrature (Q), which are commonly called TxIP and TxQP on pins 63 & 61 respectively. These signals are roughly 330mV pk-pk riding on a 1.65v DC level (I-Qref).



BLOCK DIAGRAM OF MIC TO GIF_SYN.



GMSK- Gaussian Minimum Shift Keying

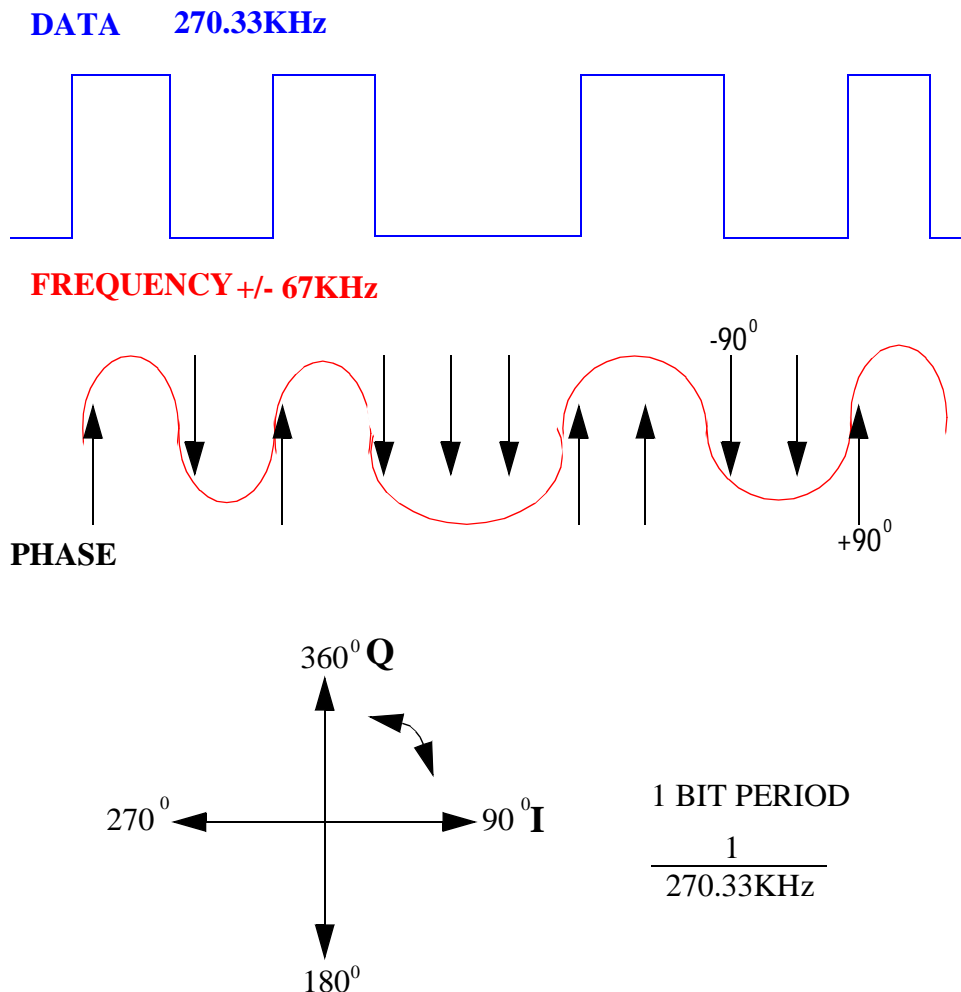
GMSK is a digital modulation technique where 1's and 0's are represented by shifting the RF carrier by plus or minus 67.708Khz. The data rate of GSM is 270.833 Kbits/second which is exactly four times the RF frequency shift.

GMSK is not phase modulation. Information is not conveyed in absolute phase states, but by the change in phase states.

1's are seen as a phase increase of 90 degrees

0's are seen as a phase decrease of 90 degrees

If a constant stream of 1's are being transmitted, MSK will stay 67.708Khz above the carrier centre frequency. If the carrier centre frequency is taken as a stationary phase reference, the 67.708Khz signal will cause a steady increase of phase. In one bit period, the phase will go a quarter of the way round the IQ diagram, or 90 degrees. Two 1's cause a phase increase of 180 degrees, three 1's - 270 degrees, and so on. 0's cause the same phase shift but in the opposite direction. See diagram below;





GIF SYN TO TRANSLATIONAL IC (TIC)

Circuit Description:

Inside the GIF_SYN, the baseband TxIQ inputs from the SMOc pass through an IQ low pass Filter. The inputs labelled TxI_P, TxI_M, TxQ_P, TxQ_M in the GIF are differential in-phase and quadrature inputs. Q is defined as lagging I by 90° . These inputs may be driven either single-ended or double-ended. In the single ended configuration TxI and TxQ are inputs while TxIX and TxQX are tied to VREF(A/D). The baseband single-ended inputs to the IQ Modulator are $0.12 \times V_{cc} \pm 10\%$ peak centred on VREF.

The IQ inputs must be filtered to avoid alias components and must keep all noise components below -79dBc on the exciter output.

After filtering the IQ signals are sent to the IQ modulator where they are mixed along with the TX Offset LO (see below). A pair of active mixers are used at this point where the outputs are recombined in a passive load and then buffered and amplified and then passed to the limiter stage and is output at -16dBm ± 2 dB into 200ohms at pin 4 of U220.

The output of the modulator is controlled by the MOD_EN pin 60 (U220). This is a digital input which controls the output of the limiter. A logic high on this pin enables the limiter output and a logic low reduces the output to -35dBm or less, this logic low also reduces current by disabling the TX Quad Generator, Mixers, IQ Buffers and limiters. The offset LO will remain locked.

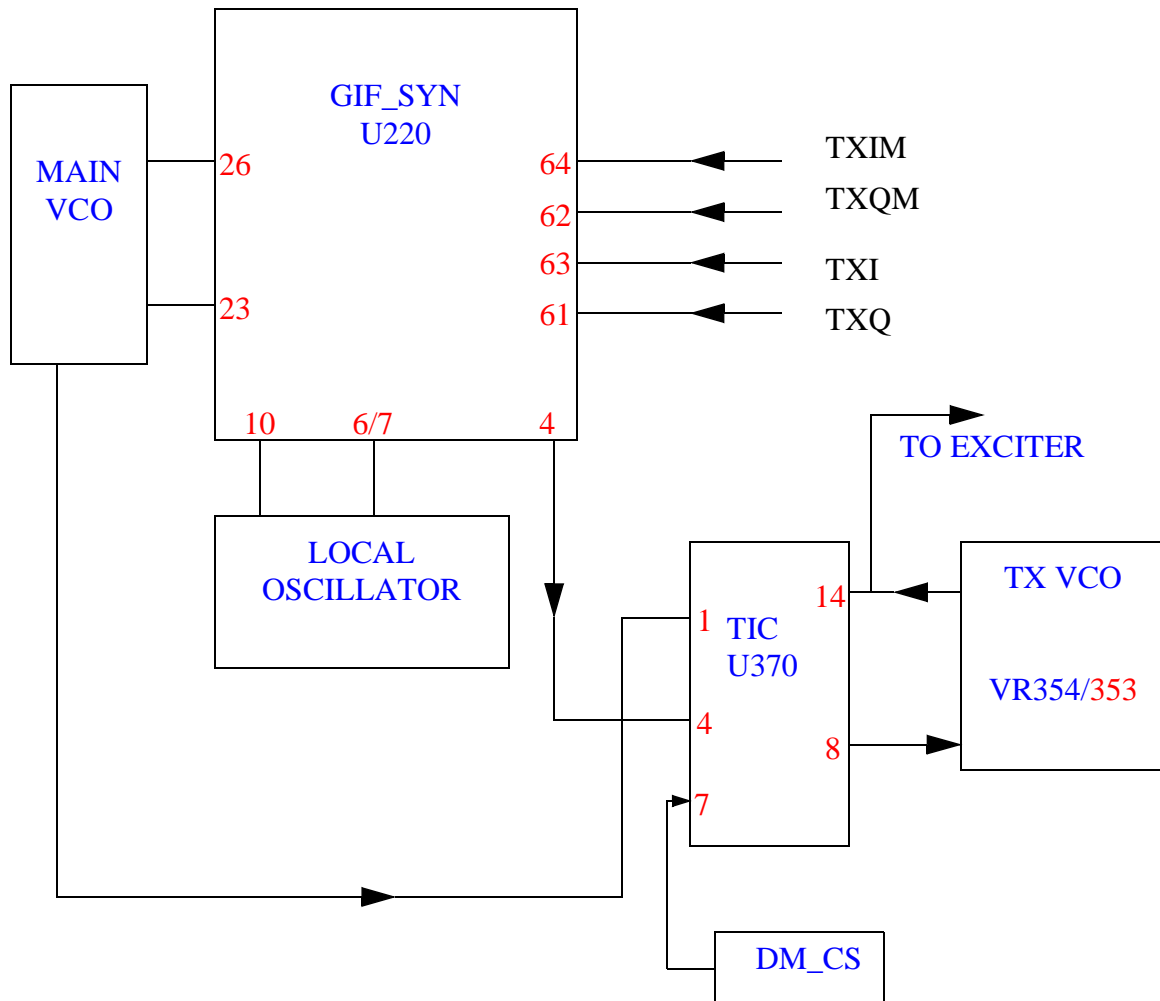
The Tx Offset LO does not frequency hop but is still fast to assure turn on times of less than 600useconds. This allows the offset VCO to be shut down between Tx bursts. The Tx Offset LO uses a 1Mhz reference derived from the 13Mhz reference. The tank circuit used operates at 340Mhz for GSM **and 240Mhz for DCS** and is divided by two internal to the GIF_SYN.

The resultant output of the limiter 170/**120**Mhz ± 67 Khz frequency shift, depending on the relationship of Q & I, is then sent to pin 4 of the TIC I.C.

The TIC I.C. (U370) converts the low frequency GMSK modulated IF signal from GIF_SYN pin 4 to the final transmit frequency without introducing noise. The TIC uses a phase lock loop (PLL) to lock the low frequency modulated 170/**120**Mhz signal to the difference between the main VCO (RX VCO) and the Tx VCO, so the loop would be locked if the difference between the Rx VCO and the Tx VCO is 170/**120**Mhz.

The Tx VCO signal is sent to pin 14 of the TIC. The Rx VCO enters the TIC at pin 1. These two signals are mixed and the difference is input to the phase detector, internal to the TIC, along with the IF input and the resultant output of the phase detector is the correction voltage that goes to the VR354/**VR353** of the GSM/**DCS** Tx VCO to change the VCO frequency. The output of the TIC is enabled by the DM_CS signal(pin 7) that is controlled by U701 pins D2 & F1.

See Diagram Overleaf;



BLOCK DIAGRAM OF GYF_SYN TO TIC.

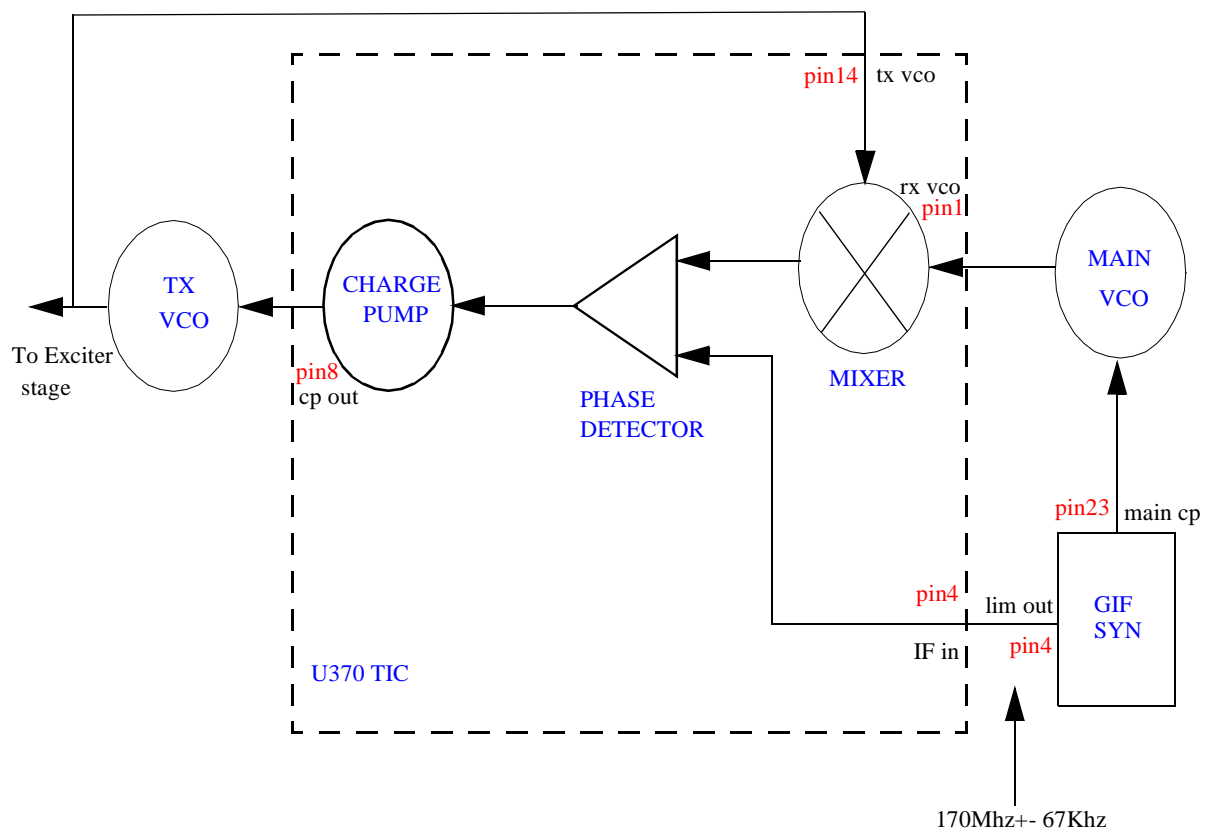


TIC OPERATION.

For the following example, we will use the mid channel on GSM.

The GIFSYN (U220) will tune the main VCO to 794.2 MHz by outputting the proper DC voltage on pin 23 (MAIN_CP). This main VCO signal will then be input to pin 1 of the TIC (U370). The GIFSYN (U220) will also output a 170 MHz \pm 67 KHz signal on pin 4 (LIM_OUT). This signal will be input to pin 4 of the TIC (U370).

Initially, the output of the mixer will not be 170 MHz because the TX VCO feedback (pin 14) is not 902.4 MHz. So, the PLL will not be locked. The phase detector will then steer the charge pump to change CP OUT (pin 8) until the TX VCO is oscillating 170 MHz above the main VCO and the PLL will be locked. When the radio changes channels the GIFSYN will tune the main VCO to the desired channel. This in-turn will change the output of the mixer causing the phase detector to steer the charge pump to change CP OUT until the TX VCO signal is 170 MHz above the main VCO and the PLL is locked.



BLOCK DIAGRAM OF TIC OPERATION.



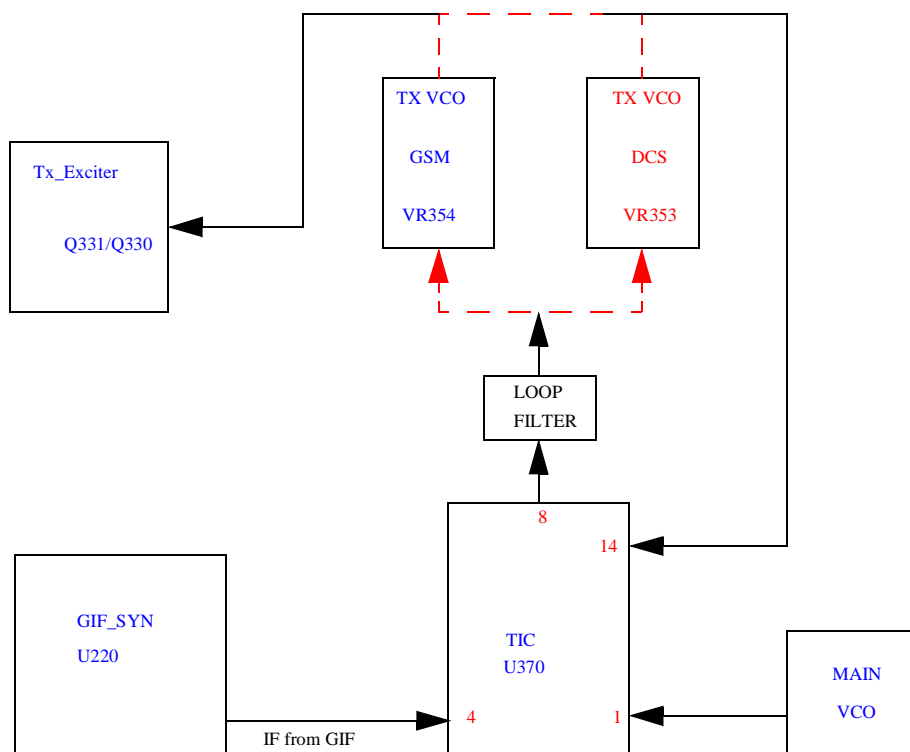
Tx VCO TO EXCITER.

Circuit Description:

Zap utilizes two Tx VCO circuits one for GSM the other for DCS. These Tx VCO's are of Colpitts oscillator configuration (capacitive feed back) where VR354 & C364 form a tank circuit for Q351, the oscillating device for GSM, and **VR353 & C356 form the tank circuit for Q350, the oscillating device for DCS.** The control voltage, CP_OUT, from the TIC (pin 8) passes through the loop filter (C378, C379 & R377) in order to clean up this signal before it reaches the required varactor for the mode of operation. Q309 determines what Tx VCO is on via control signals C1 & C2. C2 forward biases Q351 for GSM and C1 forward biases Q350 for DCS. This control voltage from the TIC changes the capacitance of the varactor; the higher the voltage, the lower the capacitance and therefore, the higher the frequency of oscillations.

Capacitors C360 & C361 are feedback capacitors for GSM and **C354 & C355 are feedback capacitors for DCS.** TL350 and TL360 are used as RF chokes to prevent RF from going to the control lines Logic_GSM_*DCS, DM_CS and B+. L350 is used as an RF choke to prevent RF from going onto the R275 supply voltage. Transmission lines TL351 & TL361 are used as part of the frequency determining network for their respective circuits.

The output of the VCO's are then sent to two points: pin 14 of the TIC and to the base of the Tx Exciter buffer amplifier Q331 and then onto the exciter Q330.



BLOCK DIAGRAM OF Tx VCO TO EXCITER



FROM EXCITER TO POWER AMP.

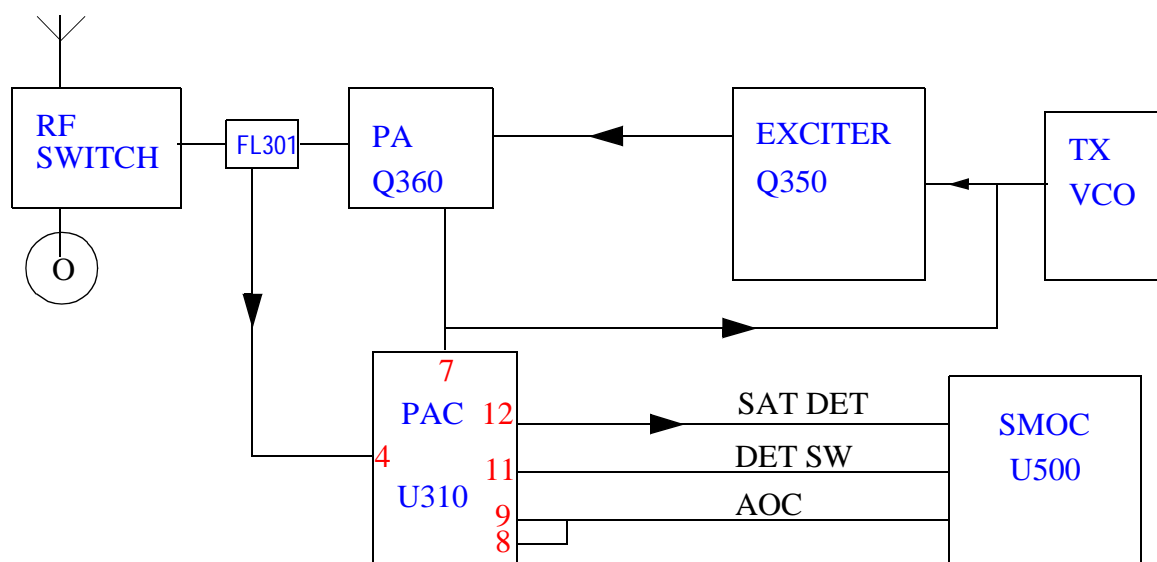
Circuit Description:

The input from the Tx VCO is passed through the driver Q330 to produce a gain of 8dBm/12dBm, then the signal is passed through a impedance matching circuit using C316, C334, C329, C324, C396, TL310, TL309. The signal is then input to the PA via pin 8. The exciter's output is controlled by the PAC I.C. (U340). This IC allows the amplifier to have a linear control voltage for ramp up/down of the PA output level. Once the transmitter is on, the peak RF power of the PA will be coupled back to pin 2 (RF_IN) of the PAC via the filter FL301. The RF detector internal to the PAC, will output a DC voltage proportional to the peak RF power. The RF detector output will be an input to a comparator (internal to the PAC), which is used to indicate the presence of the RF power. The gain is determined by pin 11 (DET_SW). This is a control signal from the SMOc to the PAC.

The AOC is an input from the SMOc to the PAC, its output level is determined by the PA DAC values 0-15. The voltage on the AOC will determine the output power of the transmitter. The output on pin 7 (EXC of the PAC) will drive the exciter and PA stages so that the RF power level presented to the RF detector results in equality of the voltage present at pin 6 (INT) and pin 8 (AOC).

When this condition is met, the PA is being driven at the proper level. The PAC I.C. also contains a saturation detector. If the buffer amplifier lags too far behind the AOC signal, its output pin 12 (SAT_DET) will go low, indicating that the loop is near saturation. SAT_DET is output from the PAC I.C. to the SMOc I.C., when this signal is low the SMOc will reduce AOC until pin 12 (SAT_DET) goes high.

The Tx output of the PA (pins 2,3,4) will be input to the bandpass filter FL301 (17dBm/13dBm Loss) before being passed onto the RF Switch (U401 pin 2). The RF Switch will then route the Tx signal to the antenna or the external connector whichever is required.



PAC IC OPERATION.



Circuit Description:

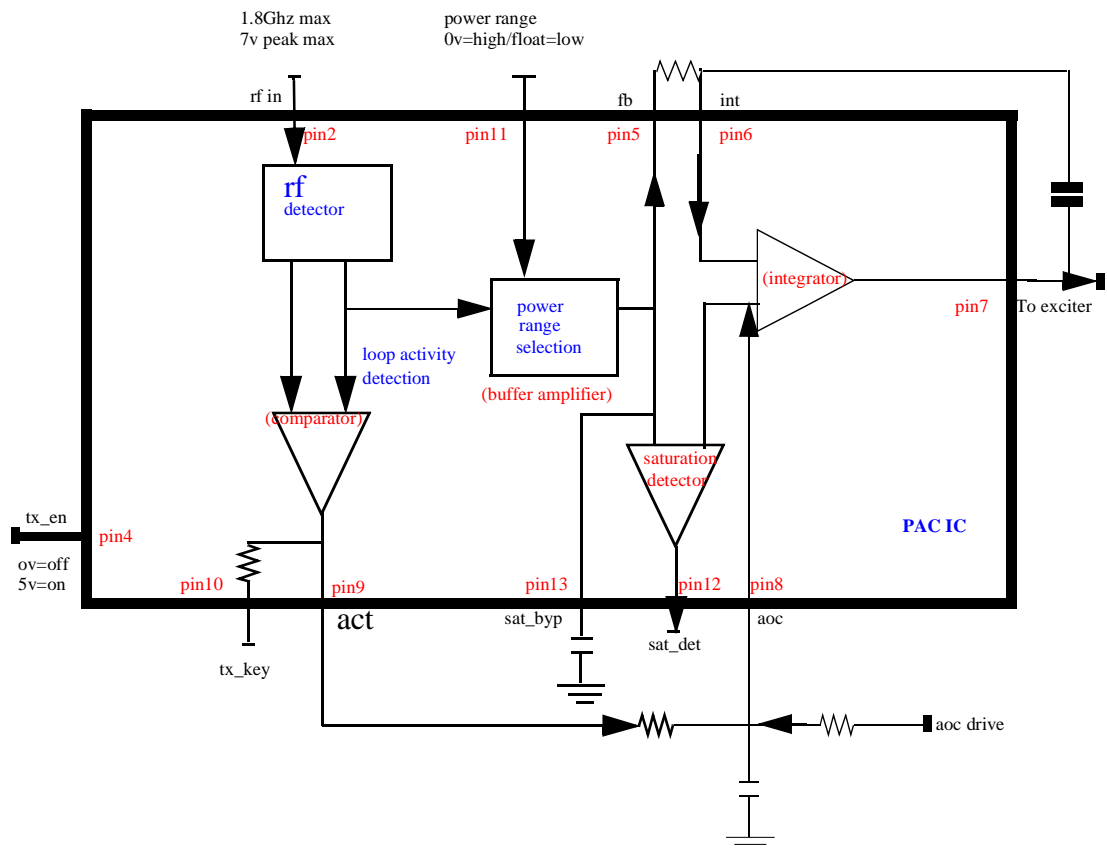
The PAC IC (U340) is used to provide precise control for the ramp up/down, of the transmit power of the radio transmitter.

Once the transmitter is on, the peak RF power out of the PA (U301) will be fed back to the PAC IC pin2(RF_IN) via FL301 and C341. The RF detector internal to the PAC, will output a DC voltage proportional to that of the peak power. The RF detector output will then be an input to a comparator (internal to the PAC), which is used to indicate the presence of RF power, a sufficient RF level must be present in order to be measured by the detector, the RF detector output will also go through a buffer amplifier which has a two gain setting. This gain setting is determined by pin11 (DET_SW). This is an input to the PAC IC from the MODEM. Its output level (high or low) is determined by the DAC values (DET_HIGH and DET_LOW). When pin11 (DET_SW) is low the gain will be 1 and when it is high the gain will be 3.

The comparator output which is pin9 (ACT) will be low when the RF detector detects an RF signal at pin2 (RF_IN). The output from the buffer amplifier will be an input to the integrator from pin5 (F.B.) via external resistor R340 and back to pin6 (INT). The other input to the integrator will be pin8 (AOC). The AOC is an input to the PAC IC from the MODEM IC, its output level is determined by the PA DAC values 0-through-15. The voltage on the AOC line will determine the output power of the transmitter. The integrator output pin7 (EXC) will drive the exciter and PA stage, so that the RF Power level presented to the RF detector results in equality of the voltage present at pin6 (INT) and pin8 (AOC).

When this condition is met, the PA is being driven at the proper level. The PAC IC (U340) also contains a saturation detector. The output of the buffer amplifier and the input on pin8 (AOC) will be the inputs to this detector.

See Diagram overleaf:



BLOCK DIAGRAM PAC IC.



RELEVANT CONTROL SIGNALS FOR THE RF PATH.

Rx_EN

Rx_EN is generated by the microprocessor (pinA9) and is used to control the mixer and LNA bias. When Rx_EN is low the front end is muted.

Rx_275

This supply to the front end is taken from the V2 regulator(Q221) on the GIF_SYN. It is used to bias the receive front end LNA. The voltage is regulated at 2.75Vdc +/- 50m Vdc.

SW_VCC

This signal comes from the GIF_SYN regulator via pin 33 and is used to supply the Isolation amp. It also supplies the diode switching network Q100 & Q105 for the GSM_*DCS/*GSM_DCS signals.

VREF

This switched supply is generated in the GCAP (pin 11) and is on when ever the radio is on. The supply is used for the reference inputs of the GIF_SYN IC regulators on the RF section. typically 2.75Vdc +/- 75mVdc.

RF_START

This signal is generated in the microprocessor (pin C2) and drives the GIF_SYN IC. The signal must be high in order the allow changing data into the shift registers without affecting the current programming. The pulse also initiates the adapt sequence in the receive IF section.

R475

This regulated supply is generated by the FCAP (pin 41) and is on when ever the radio is powered up. It is used to drive the charge pump section of the GIF_SYN IC and TIC IC. Typically 4.75 +/- 75mVdc.

R275

This signal is generated by the GCAP (pin 28) and is used to supply voltage for the TIC and the TX_VCO. Typically 2.75Vdc +/- 75mV
(Note all these sections will be enabled by TX_EN.

**Tx_EN**

This is an inverted version of TX_ON_OFF from the microprocessor(pin B1) and is used by the GIF_SYN,TIC, TX_VCO, and the T/R-RF switch.

-10V

This is a low current supply used by the Tx/Rx switch and is generated externally by regulator U101 using L500 as its supply.

DM_CS

This signal is generated by inverting the *DM_CS generated by the microprocessor at pinD2 (TP51).The inverted signal is a 3V CMOS level signal which is also routed to the 3V SMOc IC.

TX_KEY

This is an Active high digital input to the SMOc IC(pin16) generated by the microprocessor(pinC1) indicating the location of the transmission bursts. It interrupts the SMOc IC and indicates the transmitter ramp up and down operation.

***GSM_DCS**

This is an active low digital signal inverted from the Logic GSM_*DCS signal generated by the microprocessor(pinB5). It is used to control GSM or DCS operation and switches the Main Vco/Tx External oscillator/Tx Vco/PA/Tx filtering and LNA stages accordingly.



Section 7



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7)	Audio Control Circuitry	Page 50.



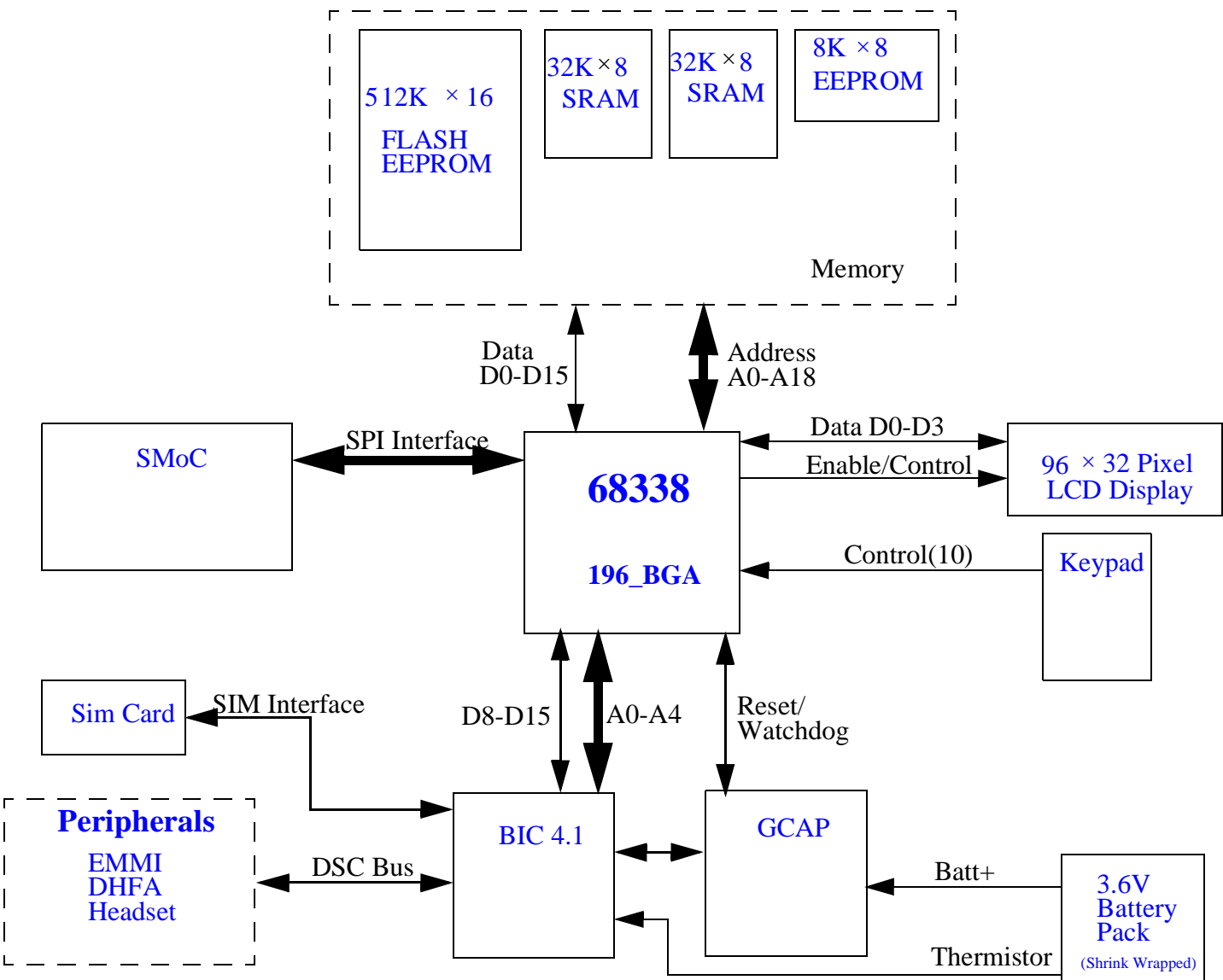
MOTOROLA

MOTOROLA CONFIDENTIAL PROPRIETRY INFORMATION



MOTOROLA

MOTOROLA CONFIDENTIAL PROPRIETARY INFORMATION





I.C.DESRIPTION

U220 Gif Syn 5.2.

This chip has the following functions:

Generation of RXI & RXQ signals, Supplies Main VCO and external tanks, cleans up the 13Mhz, RX de-modulation, Tx modulation and data links with the SMOc.

U340 PAC IC.

This IC controls the transmit power levels of the phone.

U370 TIC IC.

This IC operates as a phase lock loop, it controls the TX VCO by the use of the Modulated IF from the Gif, the Main VCO and feedback from the TX VCO.

U500 SMOc.

This IC carries out the following functions:

Modulation, Demodulation, Rx Baseband Analogue Signals (RXI&Q + IQref), Tx Inphase & Quadrature signals, RF_SPI & RF_SCK, SPI Bus from Microprocessor to RF Board, DM_CS for TX path enable, AOC/SAT_DET/DET_SW for PAC Control, Routes speech data between SMOc and BIC, AFC Control, AGC Control and A/D Conversion via the MDM_ANA_VCC.

U701 Microprocessor.

The Call processor controls the keypad, Tx, Rx, etc. and routes data to the various IC's in the phone.

U702 SRAM.

This IC contains the phones Random Access Memory.

**U703 BIC 4.1.**

The Bus Interface chip is responsible for all the external communication interfacing, it contains the A/D and D/A convertors and also routes the clock to the logic IC's.

U704 Flash Eprom.

This chip contains the phones software.

U705 EEprom.

This chip contains the phones phasing data after it has passed through test.

U900 GCAP IC.

The GCAP (Global Control Audio Power) provides regulated power supplies for both the Logic and RF sections of the phone. These supplies are R475, R275, L500, L275, VREF and VSWITCH.

R475: supplies the charge pumps in the GIF and the TIC, which drive the VCO's.

R275: Is the supply/VCC for the TX VCO and the TIC IC.

L500: Is the 5V supply for the DSC bus, SIM interface and the -10V regulator used for the T/R Switch control.

L275: Is the 2.75V supply for all logic IC's, SMOc and the display

VREF: Is the reference voltage for the GIF.

VSWITCH: The supply voltage is too low for the R475 & L500, so the DC/DC convertor mode of the GCAP is used to convert the supply up to 5.6V(Vswitch).



BOOTCODES

Bootcode programming is necessary when we are using unprogrammed or virgin Eproms.

The main reason for using Virgin Eproms are:

1. Supply.....There are no problems associated with the supply of virgin eproms.
2. Cost.....The cost of using virgin Eproms is significantly reduced.
3. Adaptability.....Changes in software can be incorporated into the virgin Eproms much easier.
4. Security.....Our software stays in-house reducing the risk of security breaches.

The following is a list of the BDM (Background develop mode) fail codes.

BDM L275

This is a check to see if the 2.75V is present at the output of the Gcap. The L275 voltage level is checked by the bootcode bay probing onto one of the boot code test points on the board. Note that the L275 is a supply for the logic side of the PCB.

BDM SIMS

This is when the bootcode bay software sets up the SIM Register in the processor, so that background mode can take control.

BDM ERAS

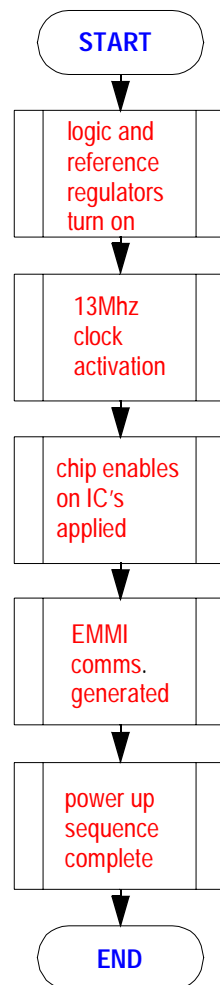
This is when the bootcode bay tries to erase all the data in the bootcode area of the Eprom whether it has already been done or not.

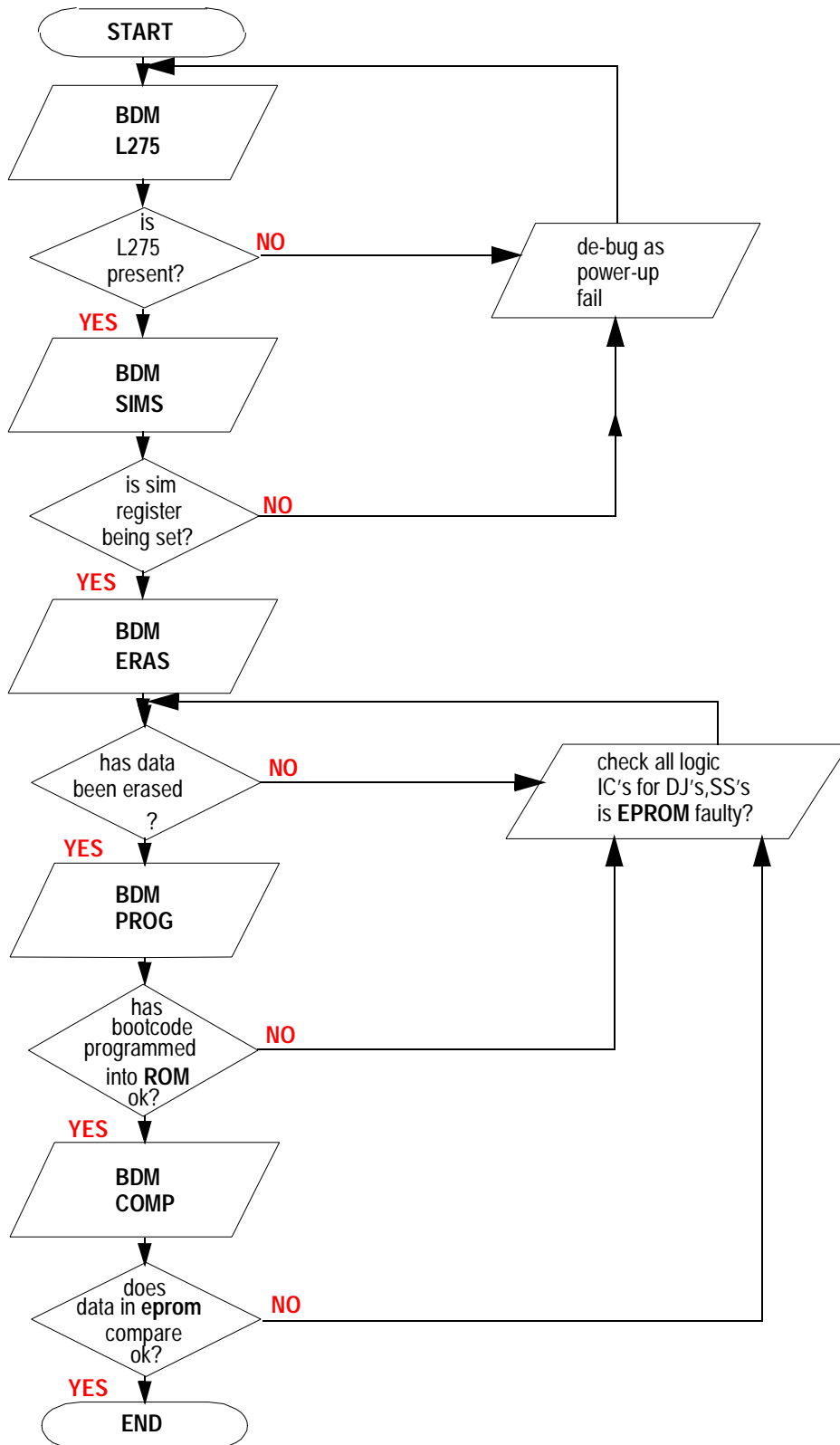
BDM PROG

The bootcode is programmed into the Eprom at this point which contains factory information relating to that particular model of phone.

BDM COMP

At this point the contents of the bootcode area of the Eprom is read back by the testbay and compared to the original data sent out.





BDM FLOW CHART

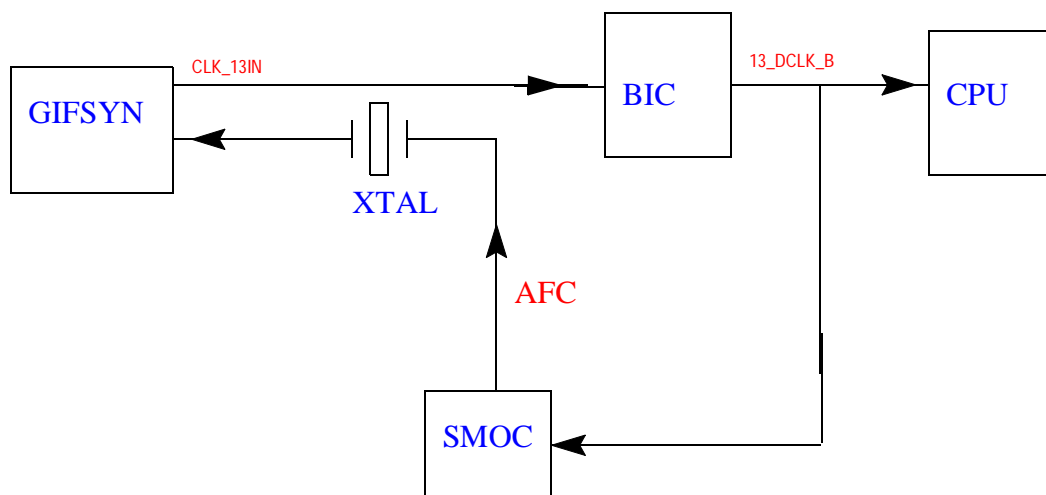
POWER UP SEQUENCE



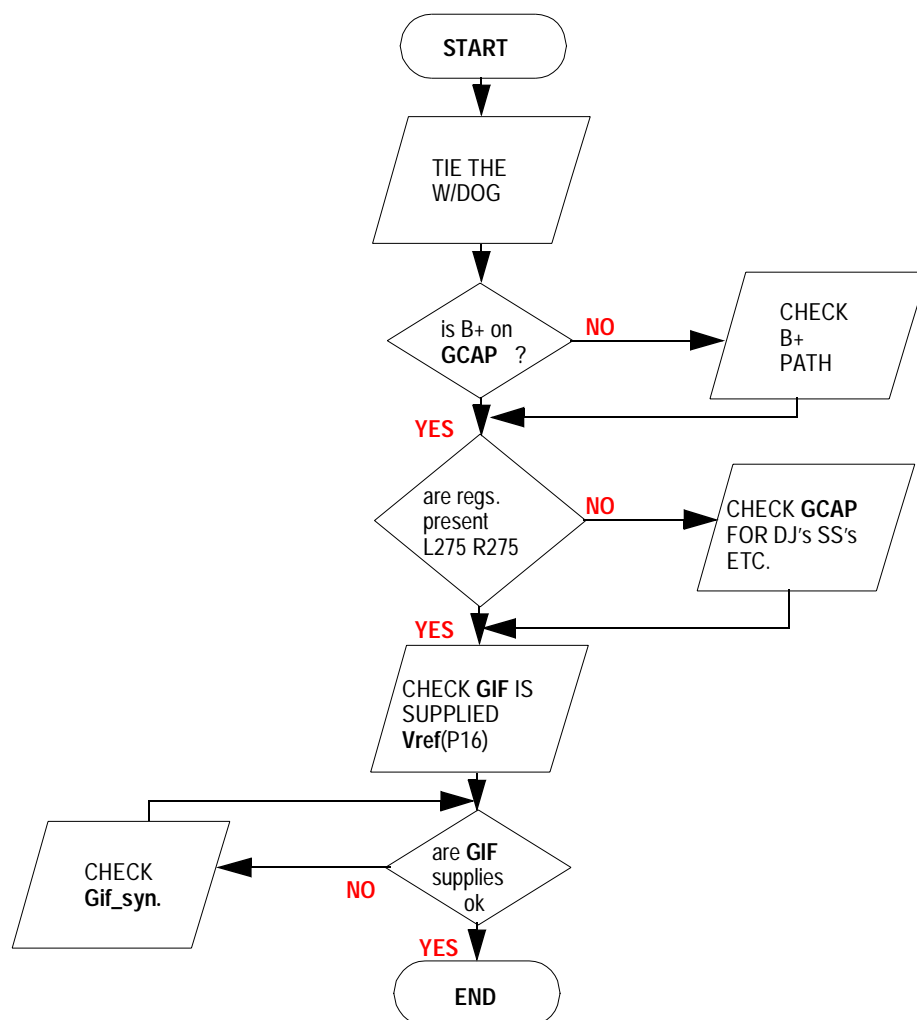
When the ON button is pressed pin 24 on the Gcap is taken low, when this happens if B+ is present at pin 40 of the Gcap, then the Gcap turns on the logic and reference regulators L275/R275 (pins 22/28). Once this has happened VREF pin11 is fed to the Gif_syn on pin 16.

When all these supplies are present the Gif_syn will turn on the 13Mhz clock. This 13Mhz clock is generated by the crystal Y702 and output by the Gif_syn at pin 59 and fed to the BIC, SMoC and Microprocessor.

At the same time the ON button is pressed the Gcap sets the reset line (pin 30) low, which allows the 13Mhz to stabilise and then allows reset to go high, allowing for bootcode programming and systems execution, i.e. chip enables, data/address bus and EMMI communications.



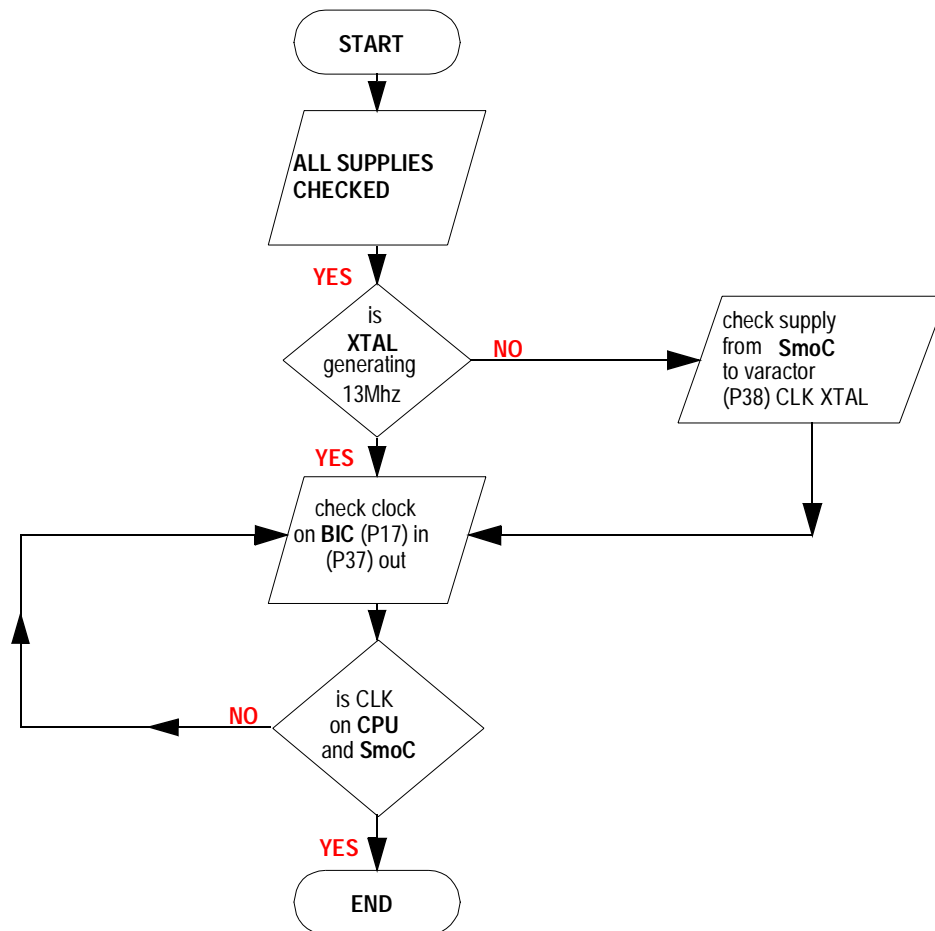
POWER SUPPLY FLOW CHART



13Mhz CLOCK



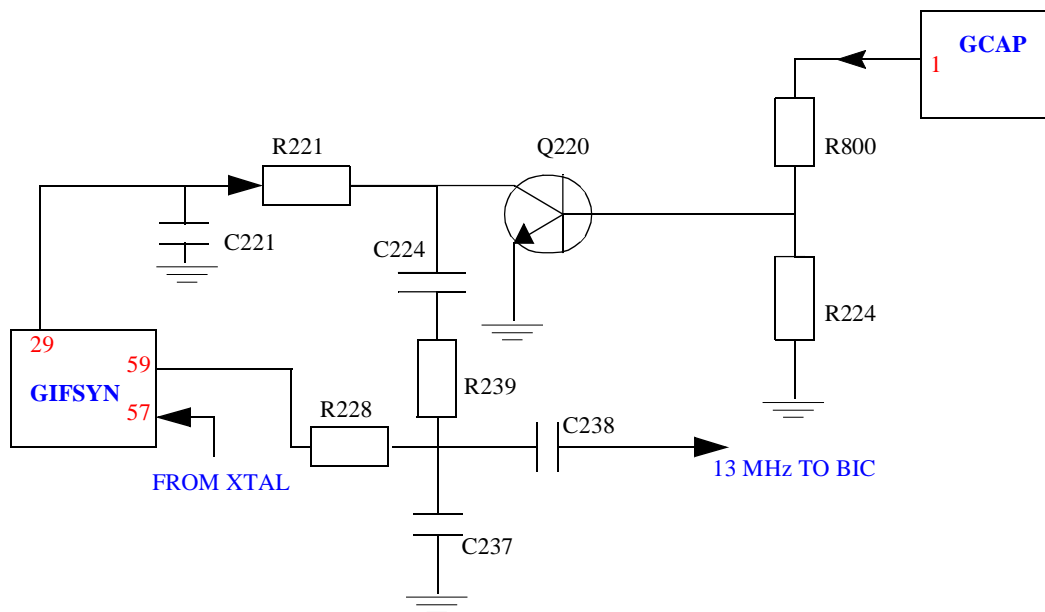
The 13Mhz clock is generated by the crystal oscillator circuit (Y702). It is input to the Gif_syn (U220) at pin 57. This signal is used internally by the Gif_syn for the 2nd LO and offset VCO by dividing down to 1Mhz and for the main VCO by dividing down to 2.6Mhz to supply a reference to those circuits. The 13Mhz clock will be output from the Gif_syn on pin 59 and input to the BIC (U703) on pin 17. The BIC will amplify and square up the 13Mhz and output it on pin 37, where it changes to 13_DCLK_B. This signal will then go to the microprocessor (U701) pin M7 and also the SMoC at pin 40.



CLOCK MODULATION CIRCUIT



Due to the 62nd and 63rd harmonics of the 13Mhz crystal clock interfering with the transmit frequencies on channels 5 and 70, a clock modulation circuit is used on the clock output. Internally programmed in the Gif_syn is the software to enable this, only when on these two channels. When this happens the Gif_syn outputs a 2.75V 500Khz pulse to the collector of Q220. The Gcap constantly gives a pump output to the base of Q220, which is also a 500Khz signal. These two signals will switch on Q220 and amplitude modulation takes place in the 13Mhz output from the Gif_syn. This will introduce some phase modulation which will knock the 13Mhz plus or minus off frequency very slightly and will therefore knock the 62nd and 63rd harmonics off frequency a lot further away from the transmit channel frequencies of channels 5 and 70. See below:



AUDIO CONTROL CIRCUITRY



When referring to audio circuitry we are talking about the circuitry used to transfer the audio signals from the input source to the U500 (SMoC), or from the U500 to the audio output. The audio input source can either be from the radio's microphone or an external microphone. The audio output source can either be the radio's speaker, the radio's alert speaker or an external speaker. We can therefore see that there are a number of different paths that can be used by the phone to transfer these audio signals.

The routing of these signals is controlled by the microprocessor (U701) via the SMoC IC using the control ports AUD_EN1(U500 pin 57) and AUD_EN2(U500 pin 60). These Audio Enable lines go to U900 pins 44 and 45 respectively. By switching these ports either high or low the processor can control which of the internal amplifiers of U900 are activated thus controlling which audio path is being used. The table below shows the Audio enable signal combinations.

AUDIO SOURCE	AUD_EN 1	AUD_EN 2	Ear Piece	Alert	Mic	Ext. Aud
No Audio Signals	0V	0V	OFF	OFF	OFF	OFF
Radio mic/speaker	0V	2.7V	ON	OFF	ON	OFF
Alert	2.7V	0V	OFF	ON	OFF	OFF
Car Kit Connection	2.7V	2.7V	OFF	OFF	OFF	ON

Audio Enable Signal Combinations.

A-D CONVERSION OF AUDIO SIGNAL



When the audio is in a call, the analogue signal is digitally coded inside the U500. The digital coding process is as follows:

- * Analogue signal enters U500.
- * The signal is A-D converted by the codec section of the U500 (SMoC) resulting in a 64 kBits/sec data stream.
- * The 64kBits/sec digital data is then input to the speech coder section of the U500 where it is compressed to 13kBits/sec by internal software algorithms.
- * A further 9kBits/sec of error correction bits are added to the signal in conjunction with the microprocessor (U701) giving a total of 22kBits/sec of digitally speech coded signal for transmission.
- * This digital stream is then sent to the modem section of the U500 where the signal is converted into TXI & Q signals which are then transmitted via the transmit path.

D - A CONVERSION OF AUDIO SIGNAL

D - A conversion is the reverse of the above process as far as the codec. Then, after the codec converts the signal to analogue, it is amplified within the U500 before being sent to U900. The attenuation is variable from 0 - 35dB in eight 5dB steps and controls the audio volume. The signal then exits U500 and follows the configured audio path to U900.

Note:- When the radio is in audio loopback mode the following happens.

- * Audio signal is passed through the input path.
- * Signal is digitally coded.
- * Digital information is looped back and decoded to analogue.
- * Signal is passed through output path.

When in audio loopback mode the analogue signal is coded, looped back and decoded - it is not sent to the modem to be converted to I & Q signals.

Schematic Symbol	Component	Intermediate	Description
A1	3909155T01	0109038A80	CNTCT ANT ZAP
BT700	0909888M01	0109038A80	RECEPT XDCR SMD
C00102	2311049A54	0109040A42	CAP TAN CHIP A/P 3.3 20 16
C00103	2311049A54	0109040A42	CAP TAN CHIP A/P 3.3 20 16
C00104	2311049A56	0109040A42	CAP TAN CHIP A/P 4.7 20 10
C00107	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00201	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00203	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00205	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00206	2113743N07	0109040A42	CAP CHIP 1.5 PF +-.25PF COG
C00207	2113743N35	0109040A42	CAP CHIP 24.0 PF 5% COG
C00208	2113743N16	0109040A42	CAP CHIP 3.9 PF +-.25PF COG
C00209	2113740L12	0109040A42	CAP CER CHIP 5.6 PF +-0.1PF
C00210	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00211	2113740L12	0109040A42	CAP CER CHIP 5.6 PF +-0.1PF
C00212	2113743N32	0109040A42	CAP CHIP 18.0 PF 5% COG
C00213	2113740L12	0109040A42	CAP CER CHIP 5.6 PF +-0.1PF
C00216	2113743N09	0109040A42	CAP CHIP 2.0 PF +-.25PF COG
C00234	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00235	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00239	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00244	2113743N40	0109038A80	CAP CHIP 39.0 PF 5% COG
C00247	2113740A67	0109040A42	CAP CHIP REEL CL1 +/-30 330
C00250	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00251	2109622N16	0109040A42	CAP CER CHIP NPO CLASS I
C00252	2109622N16	0109040A42	CAP CER CHIP NPO CLASS I
C00271	2113743L41	0109032A86	CAP CHIP 10000 PF 10% X7R
C00301	2113741F49	0109040A42	CAP CHIP CL2 X7R REEL 10000
C00304	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00314	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00317	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00318	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00322	2113743N40	0109038A80	CAP CHIP 39.0 PF 5% COG
C00337	2113743N42	0109038A80	CAP CHIP 47.0 PF 5% COG
C00340	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00341	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00342	2113743L01	0109040A42	CAP CHIP 220 PF 10% X7R
C00343	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00344	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00345	2113743L01	0109040A42	CAP CHIP 220 PF 10% X7R
C00346	2113743L01	0109040A42	CAP CHIP 220 PF 10% X7R
C00350	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00353	2113743N18	0109040A42	CAP CHIP 4.7 PF +-.25PF COG
C00360	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00361	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00362	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00363	2113743N40	0109038A80	CAP CHIP 39.0 PF 5% COG
C00364	2113740F39	0109040A42	CAP CHIP REEL CL1 +/-30 33
C00365	2113743M08	0109040A42	CAP CHIP 22000 PF +80-20% Y5V
C00367	2113743N18	0109040A42	CAP CHIP 4.7 PF +-.25PF COG
C00370	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00371	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00372	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00373	2113743N40	0109040A42	CAP CHIP 39.0 PF 5% COG

*** Motorola Internal Use Only ***

(schemsym)

Schematic Symbols of Item S8323A

Date: 30-MAR-99

LS

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Schematic Symbol	Component	Intermediate	Description
C00374	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00375	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00376	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00377	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00378	2113740F57	0109040A42	CAP CHIP REEL CL1 +/-30 180
C00379	2109622N16	0109040A42	CAP CER CHIP NPO CLASS I
C00380	2113743E11	0109040A42	CAP CHIP .039 UF 10% X7R
C00409	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00410	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00420	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00421	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00422	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00453	2113740F11	0109040A42	CAP CHIP REEL CL1 +/-30 2.2
C00460	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00461	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00462	2113743N46	0109040A42	CAP CHIP 68.0 PF 5% COG
C00468	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00469	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00470	2113743N12	0109040A42	CAP CHIP 2.7 PF +/- .25PF COG
C00481	2113740F27	0109040A42	CAP CHIP REEL CL1 +/-30 10
C00482	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00505	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00524	2113743N54	0109040A42	CAP CHIP 150 PF 5% COG
C00525	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00530	2113743N54	0109040A42	CAP CHIP 150 PF 5% COG
C00536	2113740F61	0109040A42	CAP CHIP REEL CL1 +/-130 270
C00537	2113743L05	0109040A42	CAP CHIP 330 PF 10% X7R
C00538	2113741F29	0109040A42	CAP CHIP CL2 X7R REEL 1500
C00550	2113743N54	0109040A42	CAP CHIP 150 PF 5% COG
C00551	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00552	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00553	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00554	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00555	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00556	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00557	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00558	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00559	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00560	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00561	2113743G26	0109040A42	CAP CHIP 4.7 UF 16V +80-20%
C00562	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00563	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00564	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00565	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00605	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00612	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00702	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00704	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00705	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00708	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00715	2113743L25	0109040A42	CAP CHIP 2200 PF 10% X7R
C00716	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00750	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00751	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R

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C00752	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00753	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00754	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00755	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00806	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00810	2113743A27	0109040A42	CAP CHIP .470 UF 10% 16V
C00812	2311049A56	0109040A42	CAP TAN CHIP A/P 4.7 20 10
C00816	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00850	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00858	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00860	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00861	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00901	2311049C17	0109040A42	CAP TANT CHIP 10 UF 16V 10%
C00902	2113743H14	0109040A42	CAP CHIP 10.0 UF 16V +80-20%
C00903	2113743H14	0109040A42	CAP CHIP 10.0 UF 16V +80-20%
C00904	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00905	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00907	2113928J08	0109040A42	CAP CERAMIC CHIP 10.0UF
C00908	2113743H14	0109040A42	CAP CHIP 10.0 UF 16V +80-20%
C00909	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00913	2113928J08	0109040A42	CAP CERAMIC CHIP 10.0UF
C00914	2113743L11	0109040A42	CAP CHIP 560 PF 10% X7R
C00915	2113928J08	0109040A42	CAP CERAMIC CHIP 10.0UF
C00916	2311049C16	0109040A42	CAP TANT CHIP 68 UF 10V 10%
C00977	2113743N05	0109040A42	CAP CHIP 1.2 PF +-.25PF COG
C00980	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00981	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00983	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00984	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00986	2113743F16	0109040A42	CAP CHIP 1.0 UF 16V +80-20%
C023	2113743N26	0109040A38	CAP CHIP 10.0 PF 5% COG
C024	2113743M24	0109040A38	CAP CHIP 100000 PF +80-20% Y5V
C1	2113743A19	0109040A38	CAP CHIP .100 UF 10% X7R
C105	2113743G26	0109032A85	CAP CHIP 4.7 UF 16V +80-20%
C108	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C11	2113740A03	0109040A38	CAP CHIP REEL CL1 +/-30 1.0
C12	2113740A03	0109040A38	CAP CHIP REEL CL1 +/-30 1.0
C14	2113740A03	0109040A38	CAP CHIP REEL CL1 +/-30 1.0
C2	2113743A19	0109040A38	CAP CHIP .100 UF 10% X7R
C200	2113743N07	0109032A85	CAP CHIP 1.5 PF +-.25PF COG
C202	2113743N32	0109032A85	CAP CHIP 18.0 PF 5% COG
C204	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C21	2113743L01	0109040A38	CAP CHIP 220 PF 10% X7R
C214	2113743L17	0109032A85	CAP CHIP 1000 PF 10% X7R
C217	2113743N14	0109032A85	CAP CHIP 3.3 PF +-.25PF COG
C218	2113743N69	0109032A85	CAP CHIP 1.8PF 16V +/- .25PF
C22	2113743L01	0109040A38	CAP CHIP 220 PF 10% X7R
C220	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C221	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C222	2113743N28	0109038A80	CAP CHIP 12.0 PF 5% COG
C223	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C224	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C225	2113740F67	0109038A80	CAP CHIP CL1 +/-30 470 5%
C226	2109622N09	0109038A80	CAP CER CHIP NPO CLASS I

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C227	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C228	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C229	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C230	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C231	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C232	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C233	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C236	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C237	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C238	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C240	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C241	2113743N46	0109038A80	CAP CHIP 68.0 PF 5% COG
C242	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C243	2113743G26	0109038A80	CAP CHIP 4.7 UF 16V +80-20%
C246	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C248	2113740A79	0109038A80	CAP CHIP REEL CL1 +/-30 1000
C249	2113743N03	0109038A80	CAP CHIP 1.0 PF +-.25PF COG
C253	2311049A56	0109038A80	CAP TAN CHIP A/P 4.7 20 10
C254	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C255	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C256	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C257	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C259	2113743G26	0109038A80	CAP CHIP 4.7 UF 16V +80-20%
C260	2113743N10	0109038A80	CAP CHIP 2.2 PF +-.25PF COG
C261	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C262	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C263	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C264	2311049A56	0109038A80	CAP TAN CHIP A/P 4.7 20 10
C265	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C266	2113743N32	0109038A80	CAP CHIP 18.0 PF 5% COG
C267	2113740F67	0109038A80	CAP CHIP CL1 +/-30 470 5%
C268	2113743N54	0109038A80	CAP CHIP 150 PF 5% COG
C269	2109622N09	0109038A80	CAP CER CHIP NPO CLASS I
C299	2113743N10	0109040A42	CAP CHIP 2.2 PF +-.25PF COG
C3	2113743A19	0109040A38	CAP CHIP .100 UF 10% X7R
C300	2113928J08	0109038A80	CAP CERAMIC CHIP 10.0UF
C302	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C306	2113740F09	0109038A80	CAP CHIP REEL CL1 +/-30 1.8
C307	2113740L09	0109038A80	CAP CER CHIP 4.3 PF +/-0.1PF
C308	2113743N14	0109038A80	CAP CHIP 3.3 PF +-.25PF COG
C309	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C310	2113740F11	0109038A80	CAP CHIP REEL CL1 +/-30 2.2
C311	2113740L10	0109032A86	CAP CER CHIP 4.7 PF +/-0.1PF
C312	2113742C30	0109038A80	CAP CER CHP 4.7PF +-.25PF 100V
C313	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C315	2113743N10	0109038A80	CAP CHIP 2.2 PF +-.25PF COG
C319	2113743N50	0109032A86	CAP CHIP 100 PF 5% COG
C320	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C321	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C323	2113743N30	0109032A85	CAP CHIP 15.0 PF 5% COG
C324	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C326	2113743N36	0109032A85	CAP CHIP 27.0 PF 5% COG
C327	2113743N24	0109038A80	CAP CHIP 8.2 PF + -.5PF COG
C330	2113743N24	0109038A80	CAP CHIP 8.2 PF + -.5PF COG

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C331	2113743N10	0109038A80	CAP CHIP 2.2 PF +- .25PF COG
C333	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C335	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C338	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C347	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C349	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C351	2113743L25	0109032A85	CAP CHIP 2200 PF 10% X7R
C354	2113743N10	0109032A85	CAP CHIP 2.2 PF +- .25PF COG
C355	2113743N22	0109032A85	CAP CHIP 6.8 PF + -.5PF COG
C356	2113740L20	0109032A85	CAP 12.0 PF 50V 2.0 %
C357	2113743L17	0109032A85	CAP CHIP 1000 PF 10% X7R
C359	2113743N20	0109040A42	CAP CHIP 5.6 PF + -.5PF COG
C366	2113743L41	0109032A85	CAP CHIP 10000 PF 10% X7R
C369	2113743N07	0109038A80	CAP CHIP 1.5 PF +- .25PF COG
C381	2311049B04	0109038A80	CAP TANT CHIP 4.7 UF 10V 10%
C382	2113743N69	0109032A85	CAP CHIP 1.8PF 16V +/- .25PF
C383	2113743L41	0109032A85	CAP CHIP 10000 PF 10% X7R
C384	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C385	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C388	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C389	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C390	2113743N01	0109038A80	CAP CHIP 0.5 PF +- .25PF COG
C391	2113743N02	0109038A80	CAP CHIP 0.75 PF +- .25PF COG
C392	2113743L05	0109038A80	CAP CHIP 330 PF 10% X7R
C393	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C394	2113743N18	0109038A80	CAP CHIP 4.7 PF +- .25PF COG
C395	2113740F19	0109038A80	CAP CHIP REEL CL1 +/-30 4.7
C397	2113743N34	0109032A86	CAP CHIP 22.0 PF 5% COG
C399	2113743N36	0109032A85	CAP CHIP 27.0 PF 5% COG
C4	2113743A19	0109040A38	CAP CHIP .100 UF 10% X7R
C402	2113743N18	0109038A80	CAP CHIP 4.7 PF +- .25PF COG
C403	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C408	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C411	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C412	2113743N10	0109038A80	CAP CHIP 2.2 PF +- .25PF COG
C413	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C415	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C416	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C417	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C418	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C419	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C430	2113743L41	0109032A86	CAP CHIP 10000 PF 10% X7R
C432	2113743N08	0109038A80	CAP CHIP 1.6 PF +- .25PF COG
C433	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C435	2113743L41	0109032A86	CAP CHIP 10000 PF 10% X7R
C436	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C437	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C438	2113743N50	0109032A86	CAP CHIP 100 PF 5% COG
C439	2113743N50	0109032A86	CAP CHIP 100 PF 5% COG
C440	2113743N12	0109032A86	CAP CHIP 2.7 PF +- .25PF COG
C463	2113740F13	0109040A42	CAP CHIP REEL CL1 +/-30 2.7
C5	2113743A19	0109040A38	CAP CHIP .100 UF 10% X7R
C600	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C601	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG

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C602	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C603	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C604	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C606	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C607	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C608	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C610	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C611	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C614	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C620	2113743L21	0109038A80	CAP CHIP 1500 PF 10% X7R
C701	2113740F19	0109038A80	CAP CHIP REEL CL1 +/-30 4.7
C703	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C706	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C709	2113743E07	0109038A80	CER CHIP CAP .022UF
C710	2113743N54	0109038A80	CAP CHIP 150 PF 5% COG
C711	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C712	2113743E07	0109038A80	CER CHIP CAP .022UF
C714	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C717	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C759	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C760	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C761	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C763	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C791	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C792	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C802	2113928J08	0109038A80	CAP CERAMIC CHIP 10.0UF
C803	2113743A19	0109038A80	CAP CHIP .100 UF 10% X7R
C804	2113741F21	0109038A80	CAP CHIP CL2 X7R REEL 680
C805	2113743A19	0109038A80	CAP CHIP .100 UF 10% X7R
C808	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C809	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C811	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C813	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C815	2113741F49	0109038A80	CAP CHIP CL2 X7R REEL 10000
C817	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C818	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C819	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C820	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C821	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C822	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C825	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C826	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C827	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C830	2113743N08	0109038A80	CAP CHIP 1.6 PF +- .25PF COG
C831	2113743N13	0109038A80	CAP CHIP 3.0 PF +- .25PF COG
C834	2113743N18	0109038A80	CAP CHIP 4.7 PF +- .25PF COG
C835	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C837	2113743N24	0109038A80	CAP CHIP 8.2 PF + -.5PF COG
C838	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C906	2113743H14	0109038A80	CAP CHIP 10.0 UF 16V +80-20%
C910	2113928J08	0109038A80	CAP CERAMIC CHIP 10.0UF
C911	2311049A56	0109038A80	CAP TAN CHIP A/P 4.7 20 10
C912	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C918	2113743N12	0109038A80	CAP CHIP 2.7 PF +- .25PF COG

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C919	2113743N12	0109038A80	CAP CHIP 2.7 PF +- .25PF COG
C920	2113743G26	0109038A80	CAP CHIP 4.7 UF 16V +80-20%
C923	2113743N12	0109038A80	CAP CHIP 2.7 PF +- .25PF COG
C953	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C967	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C982	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C990	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C993	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C995	2113743L11	0109038A80	CAP CHIP 560 PF 10% X7R
C996	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C997	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C998	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C999	2113741F33	0109038A80	CAP CHIP CL2 X7R REEL 2200
CR0202	4809641F02	0109040A42	DIODE VCTR ABRUPT SMD SOD232
CR0203	4809948D22	0109040A42	DIODE PIN BAR65-02W SCD-80
CR0308	4809948D22	0109040A42	DIODE PIN BAR65-02W SCD-80
CR0505	4813830M74	0109040A42	DIODE DUAL 6.8V COM ANODE
CR0604	4809653F07	0109040A42	RECT SCHTTKY 1A MBRM120ET3
CR0710	4809118D01	0109040A42	LED BICOLOR LNJ107W5PRA1
CR1	4809606E02	0109040A38	DIODE DUAL ARRAY DAN222
CR2	4813832P75	0109040A38	TRANS SUP QUAD 6.8 V
CR220	4809641F02	0109038A80	DIODE VCTR ABRUPT SMD SOD232
CR221	4809641F04	0109038A80	DIODE VCTR SMV1204-70 SOT23
CR223	4809948D05	0109032A86	DIODE RF SWITCH SMT SOD323
CR261	4809641F02	0109038A80	DIODE VCTR ABRUPT SMD SOD232
CR3	4813832P75	0109040A38	TRANS SUP QUAD 6.8 V
CR301	4809948D22	0109032A86	DIODE PIN BAR65-02W SCD-80
CR302	4809948D22	0109032A86	DIODE PIN BAR65-02W SCD-80
CR303	4809948D10	0109038A80	DIODE PIN BAR63-03
CR304	4809948D13	0109032A86	DIODE RF SWITCH BA892 ESC
CR306	4809948D13	0109032A86	DIODE RF SWITCH BA892 ESC
CR307	4809948D13	0109032A86	DIODE RF SWITCH BA892 ESC
CR501	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR502	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR503	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR504	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR601	4809606E02	0109040A42	DIODE DUAL ARRAY DAN222
CR602	4809606E07	0109038A80	DIODE DUAL ARRAY DA221
CR605	4809653F07	0109038A80	RECT SCHTTKY 1A MBRM120ET3
CR607	4809606E07	0109038A80	DIODE DUAL ARRAY DA221
CR608	4809606E02	0109038A80	DIODE DUAL ARRAY DAN222
CR702	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR703	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR704	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR705	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR706	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR903	4809653F07	0109038A80	RECT SCHTTKY 1A MBRM120ET3
CR910	4809653F07	0109038A80	RECT SCHTTKY 1A MBRM120ET3
DS1	4809938N10	0109040A38	LED CHIP YEL/GRN LNJ312G8T
DS101	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS102	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS103	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS104	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS2	4809938N10	0109040A38	LED CHIP YEL/GRN LNJ312G8T

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DS3	4809938N10	0109040A38	LED CHIP YEL/GRN LNJ312G8T
DS4	4809938N10	0109040A38	LED CHIP YEL/GRN LNJ312G8T
DS5	4809938N10	0109040A38	LED CHIP YEL/GRN LNJ312G8T
DS6	4809938N10	0109040A38	LED CHIP YEL/GRN LNJ312G8T
FL0480	9109035M01	0109040A42	FLTR SAW BP 215MHZ SMD
FL301	9109193T05	0109038A80	FLTR CER LP 897/1747MHZ SMD
FL400	9109144M01	0109038A80	FLTR CER RX 900MHZ SMD
FL401	9109111C08	0109032A86	FLTR CER 1800 MHZ SMD
FL461	9109157M01	0109038A80	FLTR SAW RX+LO 947/727 SMD
FL462	9109429J04	0109032A86	FLTR CER RX-LO1800MHZ SMD
J00500	2809424M01	0109040A42	HDR INTRBRD CONN 2X16 ZAP
J00502	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00503	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00504	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00505	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00803	0909888M04	0109040A42	RECEPT XDCR SMD
J0803A	3909301S02	0109040A42	CNTCT BATT PCB ZAPPA
J0803B	3909301S02	0109040A42	CNTCT BATT PCB ZAPPA
J506	3909173T01	0109038A80	CNTCT PCB SMD ZAP
J507	3909173T01	0109038A80	CNTCT PCB SMD ZAP
J600	0909449B03	0109038A80	RECEPT MODULE 15 PIN SMD
J603	0909888M01	0109038A80	RECEPT XDCR SMD
J802	0909195E01	0109038A80	SKT BOT ENTRY 2 POS
J900	3909426M01	0109038A80	CNTCT BLK SIM CARD READER ZAP
L00201	2409154M88	0109040A42	IND CER MLTILYR 10.0NH 1005
L00203	2409154M96	0109040A42	IND CER MLTILYR 47.0NH 1005
L00204	2409154M91	0109040A42	IND CER MLTILYR 18.0NH 1005
L00205	2409154M38	0109040A42	IND CER MLTILYR 15.0NH 1005
L00222	2462587Q03	0109040A42	IND CHIP 82 NH 20%
L00226	2462587Q36	0109040A42	IND CHIP 120 NH 10%
L00301	2409154M84	0109032A86	IND CER MLTILYR 4.7 NH 1005
L00350	2409154M37	0109040A42	IND CER MLTILYR 12.0NH 1005
L00401	2409154M38	0109040A42	IND CER MLTILYR 15.0NH 1005
L00451	2409646M30	0109040A42	IND CER MULTILYR 8.2NH 1608
L00460	2409646M28	0109040A42	IND CER MULTILYR 5.6NH 1608
L00461	2409646M70	0109040A42	IND CER MULTILYR 56NH 1608
L00462	2409646M26	0109040A42	IND CER MULTILYR 3.9NH 1608
L00465	2409646M44	0109040A42	IN CER MULTILYR
L00498	2409646M72	0109040A42	IND CER MULTILYR 82NH 1608
L00520	2462587P36	0109040A42	CHIP IND 100000 NH
L202	2409154M96	0109038A80	IND CER MLTILYR 47.0NH 1005
L206	2409154M83	0109032A85	IND CER MLTILYR 3.9 NH 1005
L207	2409154M96	0109038A80	IND CER MLTILYR 47.0NH 1005
L220	2409257L15	0109038A80	IND CHIP MLTLYR 18 NH 1608
L221	2409704K50	0109038A80	IND CHIP MULTILYR 120NH 2012
L223	2462587Q35	0109038A80	IND CHIP 100 NH 10%
L224	2409257L18	0109032A86	IND CHIP MLTLYR 33 NH 1608
L225	2409646M37	0109038A80	IND CER MULTILYR 33NH 1608
L261	2409377M08	0109038A80	IND CHIP WW 22 NH 5% 1608
L303	2409154M62	0109032A86	IND CER MTLILYR 8.2 NH 1005
L304	2409154M60	0109038A80	IND CER MTLILYR 5.6 NH 1005
L309	2409646M93	0109038A80	IN CER MULTILYR 3.3NH 1608
L310	2409154M87	0109038A80	IND CER MLTILYR 8.2 NH 1005
L332	2409134J27	0109038A80	IND CHIP FER FLTR 1000 0402

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L351	2409154M83	0109038A80	IND CER MLTILYR 3.9 NH 1005
L367	2409154M84	0109040A42	IND CER MLTILYR 4.7 NH 1005
L402	2409154M60	0109038A80	IND CER MTLILYR 5.6 NH 1005
L410	2409646M30	0109038A80	IND CER MULTILYR 8.2NH 1608
L411	2409646M56	0109038A80	IN CER MULTILYR 10 NH 1608
L413	2409646M81	0109038A80	IN CER MULTILYR 10 NH 1608
L430	2409154M81	0109032A86	IND CER MLTILYR 2.7 NH 1005
L902	2503788S10	0109038A80	IND PWR 33 UH 20% 0.58A D01608
PCB	8403913S05	0109040A38	PCB ZAP METAL DOME KYPD
PCB	8409261U15	0109040A42	PCB ZAP TSOP XCVR
Q00109	4809605E02	0109040A42	TSTR SIG NPN 2SC4617
Q00111	4809605E05	0109040A42	TSTR SIG NPN 2SD1664 SOT89
Q00201	4809527E24	0109040A42	TSTR NPN RF MRF949LT1 SC-90
Q00202	4809527E24	0109040A42	TSTR NPN RF MRF949LT1 SC-90
Q00206	4809527E24	0109040A42	TSTR NPN RF MRF949LT1 SC-90
Q00301	4809579E17	0109040A42	TSTR MOSFET P-CHAN SI9424
Q00305	4809939C06	0109040A42	TSTR DUAL PNP/NPN UMZ2N
Q00351	4809940E01	0109040A42	TSTR NPN MRF947 A/P
Q00460	4809527E20	0109040A42	TSTR NPN RF 2SC4784 SC70
Q00480	4809940E01	0109040A42	TSTR NPN MRF947 A/P
Q00501	4809607E05	0109040A42	TSTR PNP DTA143EE
Q00520	4809607E05	0109040A42	TSTR PNP DTA143EE
Q00602	4809939C05	0109040A42	TSTR DUAL NPN/PNP UMC 5
Q00603	4809608E03	0109040A42	TSTR DIG PNP DTA114YE
Q00604	4809607E04	0109040A42	TSTR SIG PNP 2SB1132 SOT89
Q00605	4809605E02	0109040A42	TSTR SIG NPN 2SC4617
Q00704	4809940E02	0109040A42	TSTR DIG NPN DTC114YE
Q00705	4809940E02	0109040A42	TSTR DIG NPN DTC114YE
Q00711	4809939C10	0109040A42	TSTR DUAL PNP/PNP UMT1N
Q0412	4809939C07	0109032A86	TSTR DUAL PNP/PNP UMA4NTL
Q1	4809607E02	0109040A38	TSTR SIG PNP 25A1774
Q100	4809939C05	0109032A85	TSTR DUAL NPN/PNP UMC 5
Q100	4809605E05	0109040A38	TSTR SIG NPN 2SD1664 SOT89
Q101	4809605E02	0109040A38	TSTR SIG NPN 2SC4617
Q105	4809608E03	0109032A85	TSTR DIG PNP DTA114YE
Q2	4809607E02	0109040A38	TSTR SIG PNP 25A1774
Q200	4809527E30	0109032A85	TSTR NPN RF NE68719 SC90
Q205	4809939C07	0109032A85	TSTR DUAL PNP/PNP UMA4NTL
Q220	4809605E02	0109038A80	TSTR SIG NPN 2SC4617
Q221	4809579E18	0109038A80	TSTR MOSFET P-CHAN TP0101T
Q222	4809579E18	0109038A80	TSTR MOSFET P-CHAN TP0101T
Q300	4809939C12	0109040A42	TSTR DUAL NPN/NPN UPA806T-T1
Q304	4809939C07	0109032A85	TSTR DUAL PNP/PNP UMA4NTL
Q306	4809939C06	0109032A85	TSTR DUAL PNP/NPN UMZ2N
Q309	4809939C07	0109032A85	TSTR DUAL PNP/PNP UMA4NTL
Q330	4809527E26	0109038A80	TSTR NPN RF 25C5081 SOT343
Q331	4809527E24	0109038A80	TSTR NPN RF MRF949LT1 SC-90
Q350	4809940E01	0109032A85	TSTR NPN MRF947 A/P
Q410	4809527E30	0109038A80	TSTR NPN RF NE68719 SC90
Q411	4809527E24	0109038A80	TSTR NPN RF MRF949LT1 SC-90
Q430	4809527E32	0109032A86	TSTR NPN RF BFP320W
Q431	4809527E24	0109032A86	TSTR NPN RF MRF949LT1 SC-90
Q601	4809579E04	0109038A80	TSTR MOSFET P-CHAN SI9434DY
Q701	4809605E02	0109038A80	TSTR SIG NPN 2SC4617

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Q702	4809940E03	0109038A80	TSTR DIG NPN DTC114TE
Q703	4813824M33	0109038A80	TSTR NPN 60V .6A GEN PURP
Q706	4809605E02	0109038A80	TSTR SIG NPN 2SC4617
Q709	4809608E03	0109038A80	TSTR DIG PNP DTA114YE
Q905	4809939C10	0109038A80	TSTR DUAL PNP/PNP UMT1N
Q906	4809579E17	0109038A80	TSTR MOSFET P-CHAN SI9424
Q907	4809939C05	0109038A80	TSTR DUAL NPN/PNP UMC 5
R00118	0660076N03	0109040A42	RES CHIP 12 OHM 5 1/8W
R00121	0662057M80	0109040A42	RES. CHIP 1800 5% 20X40
R00202	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00203	0662057M54	0109040A42	RES. CHIP 150 5% 20X40
R00204	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00205	0662057M84	0109040A42	RES. CHIP 2700 5% 20X40
R00206	0662057M52	0109040A42	RES. CHIP 120 5% 20X40
R00207	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00209	0662057M34	0109040A42	RES. CHIP 22 5% 20X40
R00210	0662057M78	0109040A42	RES. CHIP 1500 5% 20X40
R00211	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00212	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00213	0662057M80	0109040A42	RES. CHIP 1800 5% 20X40
R00214	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00227	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00229	0662057M38	0109040A42	RES CHIP 33 5% 20X40
R00232	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00233	0662057M38	0109040A42	RES CHIP 33 5% 20X40
R00234	0662057M84	0109040A42	RES. CHIP 2700 5% 20X40
R00245	0662057M68	0109040A42	RES. CHIP 560 5% 20X40
R00301	0662057M62	0109040A42	RES. CHIP 330 5% 20X40
R00302	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00305	0662057M76	0109040A42	RES. CHIP 1200 5% 20X40
R00306	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00307	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00309	0609591M43	0109032A85	RES CHIP DUAL 33K 5% 0.63W
R00313	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00316	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00318	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00318	0662057M70	0109040A42	RES. CHIP 680 5% 20X40
R00321	0662057M80	0109040A42	RES. CHIP 1800 5% 20X40
R00328	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00330	0662057M70	0109040A42	RES. CHIP 680 5% 20X40
R00331	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00335	0662057M44	0109040A42	RES CHIP 56 5% 20X40
R00337	0662057M40	0109040A42	RES. CHIP 39 5% 20X40
R00340	0662057M94	0109040A42	RES. CHIP 6800 5% 20X40
R00341	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00342	0662057M94	0109040A42	RES. CHIP 6800 5% 20X40
R00343	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00354	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00357	0662057M38	0109040A42	RES CHIP 33 5% 20X40
R00358	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00370	0662057M54	0109040A42	RES. CHIP 150 5% 20X40
R00374	0662057M26	0109040A42	RES. CHIP 10 5% 20X40
R00377	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00405	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40

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R00406	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00451	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00461	0662057M84	0109040A42	RES. CHIP 2700 5% 20X40
R00462	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00468	0662057M52	0109040A42	RES. CHIP 120 5% 20X40
R00480	0662057M76	0109040A42	RES. CHIP 1200 5% 20X40
R00481	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00482	0662057M62	0109040A42	RES. CHIP 330 5% 20X40
R00483	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00501	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00502	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00504	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00505	0662057N03	0109040A42	RES. CHIP 15K 5% 20X40
R00510	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00511	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00514	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00516	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00525	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00526	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00555	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00601	0662057N06	0109040A42	RES. CHIP 20K 5% 20X40
R00606	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00607	0662057N11	0109040A42	RES. CHIP 33K 5% 20X40
R00608	0662057N01	0109040A42	RES CHIP 12K 5% 20X40
R00616	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00617	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00703	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00705	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00712	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00723	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00726	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00728	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00732	0662057N06	0109040A42	RES. CHIP 20K 5% 20X40
R00733	0662057M61	0109040A42	RES CHIP 300 5% 20X40
R00734	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00735	0662057M50	0109040A42	RES. CHIP 100 5% 20X40
R00736	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00739	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00740	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00741	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00742	0662057N03	0109040A42	RES. CHIP 15K 5% 20X40
R00743	0662057N03	0109040A42	RES. CHIP 15K 5% 20X40
R00753	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00770	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00771	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00772	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00773	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00774	0609591M49	0109040A42	RES CHIP DUAL 100K 5% .63W
R00775	0609591M49	0109040A42	RES CHIP DUAL 100K 5% .63W
R00776	0609591M49	0109040A42	RES CHIP DUAL 100K 5% .63W
R00777	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00778	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00805	0662057N19	0109040A42	RES. CHIP 68K 5% 20X40
R00806	0662057M68	0109040A42	RES. CHIP 560 5% 20X40

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R00808	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00812	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00852	0662057M26	0109040A42	RES. CHIP 10 5% 20X40
R00853	0662057M26	0109040A42	RES. CHIP 10 5% 20X40
R00920	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00977	0662057M76	0109040A42	RES. CHIP 1200 5% 20X40
R00984	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00985	0609591M42	0109040A42	RES CHIP DUAL 27K 5% 0.63W
R102	0609591M07	0109038A80	RES CHIP DUAL 33 5% 0.63W
R103	0609591M07	0109038A80	RES CHIP DUAL 33 5% 0.63W
R103	0660076N55	0109040A38	RES CHIP 1800 OHM 1/16 W
R104	0660076N01	0109040A38	RES CHIP 10 OHM 5 1/16W
R106	0662057N11	0109032A85	RES. CHIP 33K 5% 20X40
R106	0699200A13	0109040A38	RES CHIP DUAL 33 5% 0603
R107	0662057N11	0109032A85	RES. CHIP 33K 5% 20X40
R107	0699200A13	0109040A38	RES CHIP DUAL 33 5% 0603
R108	0699200A13	0109040A38	RES CHIP DUAL 33 5% 0603
R109	0660076N89	0109040A38	RES CHIP 47 K OHM 1/16 W
R110	0662057M62	0109032A85	RES. CHIP 330 5% 20X40
R111	0662057M98	0109032A85	RES. CHIP 10K 5% 20X40
R14	0660076N79	0109040A38	RES CHIP 18 K OHM 1/16 W
R15	0660076P11	0109040A38	RES CHIP 270K OHM 5 1/8W
R18	0660076N87	0109040A38	RES CHIP 39 K OHM 1/16 W
R200	0662057M38	0109032A85	RES CHIP 33 5% 20X40
R215	0662057M76	0109032A85	RES. CHIP 1200 5% 20X40
R216	0662057M90	0109032A85	RES. CHIP 4700 5% 20X40
R217	0662057M85	0109032A85	RES. CHIP 3000 5% 20X40
R219	0662057M38	0109038A80	RES CHIP 33 5% 20X40
R220	0662057M80	0109038A80	RES. CHIP 1800 5% 20X40
R221	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R222	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R223	0662057M26	0109038A80	RES. CHIP 10 5% 20X40
R224	0662057N15	0109038A80	RES. CHIP 47K 5% 20X40
R225	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R226	0662057M38	0109038A80	RES CHIP 33 5% 20X40
R228	0662057M26	0109038A80	RES. CHIP 10 5% 20X40
R230	0662057N13	0109038A80	RES. CHIP 39K 5% 20X40
R231	0662057N29	0109038A80	RES CHIP 180K 5% 20X40
R238	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R239	0662057N17	0109038A80	RES. CHIP 56K 5% 20X40
R240	0662057M80	0109038A80	RES. CHIP 1800 5% 20X40
R241	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R242	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R243	0662057M82	0109032A85	RES. CHIP 2200 5% 20X40
R250	0662057M68	0109032A85	RES. CHIP 560 5% 20X40
R303	0662057M43	0109038A80	RES. CHIP 51 5% 20X40
R310	0662057M74	0109032A86	RES. CHIP 1000 5% 20X40
R311	0662057M70	0109032A86	RES. CHIP 680 5% 20X40
R312	0662057M70	0109032A86	RES. CHIP 680 5% 20X40
R313	0662057M43	0109032A85	RES. CHIP 51 5% 20X40
R314	0662057M78	0109032A85	RES. CHIP 1500 5% 20X40
R315	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R319	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R320	0662057M58	0109038A80	RES. CHIP 220 5% 20X40

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Schematic Symbol	Component	Intermediate	Description
R322	0662057M98	0109032A85	RES. CHIP 10K 5% 20X40
R324	0662057N09	0109032A85	RES. CHIP 27K 5% 20X40
R325	0662057N01	0109032A85	RES CHIP 12K 5% 20X40
R326	0662057N03	0109032A85	RES. CHIP 15K 5% 20X40
R329	0662057M78	0109032A86	RES. CHIP 1500 5% 20X40
R332	0662057M38	0109038A80	RES CHIP 33 5% 20X40
R333	0662057M92	0109038A80	RES. CHIP 5600 5% 20X40
R334	0662057M88	0109038A80	RES. CHIP 3900 5% 20X40
R336	0662057M26	0109032A85	RES. CHIP 10 5% 20X40
R339	0662057M62	0109038A80	RES. CHIP 330 5% 20X40
R349	0662057M26	0109038A80	RES. CHIP 10 5% 20X40
R351	0662057M90	0109032A85	RES. CHIP 4700 5% 20X40
R353	0662057M34	0109032A85	RES. CHIP 22 5% 20X40
R355	0662057M82	0109032A85	RES. CHIP 2200 5% 20X40
R368	0662057M78	0109032A85	RES. CHIP 1500 5% 20X40
R369	0662057M80	0109032A85	RES. CHIP 1800 5% 20X40
R371	0662057N47	0109040A42	RES. CHIP 1.0 MEG 5% 20X40
R373	0662057N47	0109040A42	RES. CHIP 1.0 MEG 5% 20X40
R410	0662057M30	0109038A80	RES. CHIP 15 5% 20X40
R411	0662057M92	0109038A80	RES. CHIP 5600 5% 20X40
R412	0662057M90	0109038A80	RES. CHIP 4700 5% 20X40
R415	0609591M33	0109038A80	RES CHIP DUAL 4.7K 5% 0.63W
R418	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R430	0662057M30	0109032A86	RES. CHIP 15 5% 20X40
R431	0609591M33	0109032A86	RES CHIP DUAL 4.7K 5% 0.63W
R432	0662057M90	0109032A86	RES. CHIP 4700 5% 20X40
R433	0662057M92	0109032A86	RES. CHIP 5600 5% 20X40
R437	0662057M54	0109032A86	RES. CHIP 150 5% 20X40
R450	0662057M01	0109032A85	RES. CHIP 0 5% 20X40
R602	0680195M64	0109038A80	RES 0.24 OHM 1/2W
R603	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R611	0609591M37	0109038A80	RES CHIP DUAL 10K 5% 0.63W
R614	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R650	0662057M90	0109038A80	RES. CHIP 4700 5% 20X40
R701	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R704	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R706	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R707	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R708	0609591M57	0109038A80	RES CHIP DUAL 470K 5% .63W
R709	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R710	0609591M49	0109038A80	RES CHIP DUAL 100K 5% .63W
R711	0609591M39	0109038A80	RES CHIP DUAL 15K 5% 0.63W
R713	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R714	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R715	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R716	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R717	0662057M78	0109038A80	RES. CHIP 1500 5% 20X40
R718	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R719	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R720	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R721	0662057M58	0109038A80	RES. CHIP 220 5% 20X40
R722	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R724	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R725	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40

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R731	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R745	0609591M49	0109038A80	RES CHIP DUAL 100K 5% .63W
R754	0662057N10	0109038A80	RES. CHIP 30K 5% 20X40
R755	0662057N39	0109038A80	RES CHIP 470K 5% 20X40
R765	0662057N09	0109038A80	RES. CHIP 27K 5% 20X40
R766	0662057N39	0109038A80	RES CHIP 470K 5% 20X40
R791	0662057N15	0109038A80	RES. CHIP 47K 5% 20X40
R800	0662057N33	0109038A80	RES. CHIP 270K 5% 20X40
R801	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R802	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R803	0662057N05	0109038A80	RES. CHIP 18K 5% 20X40
R804	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R807	0662057M68	0109038A80	RES. CHIP 560 5% 20X40
R809	0662057M68	0109038A80	RES. CHIP 560 5% 20X40
R810	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R811	0662057N21	0109038A80	RES. CHIP 82K 5% 20X40
R815	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R817	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R818	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R819	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R901	0609591M33	0109038A80	RES CHIP DUAL 4.7K 5% 0.63W
R905	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R911	0662057M90	0109038A80	RES. CHIP 4700 5% 20X40
R912	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R913	0662057N27	0109038A80	RES. CHIP 150K 5% 20X40
R914	0662057N32	0109038A80	RES. CHIP 240K 5% 20X40
R915	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R980	0609591M45	0109040A42	RES CHIP DUAL 47K 5% 0.63W
R982	0662057M50	0109032A85	RES. CHIP 100 5% 20X40
R988	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R990	0662057M78	0109032A86	RES. CHIP 1500 5% 20X40
R993	0662057N15	0109038A80	RES. CHIP 47K 5% 20X40
R994	0609591M45	0109038A80	RES CHIP DUAL 47K 5% 0.63W
R996	0662057M21	0109038A80	RES. CHIP 6.2 5% 20X40
R997	0609591M37	0109038A80	RES CHIP DUAL 10K 5% 0.63W
RT1	0613925A17	0109040A38	TMTR CHIP 100K 5%
S119	4082635T09	0109040A38	SWITCH REED SMD 16-20AT
SH0005	2609480M01	0109040A42	SHIELD VCO/TIC ZAP
SH0006	2609480M01	0109040A42	SHIELD VCO/TIC ZAP
SH0007	2609480M01	0109040A42	SHIELD VCO/TIC ZAP
SH0008	2609478M01	0109040A42	SHIELD MIXER/ISO AMP ZAP
SH0009	2609479M01	0109040A42	SHIELD RF SWITCH ZAP
SH0011	2609482M01	0109040A42	SHIELD LOGIC 2 ZAP
SH0013	2609483M01	0109040A42	SHIELD LOGIC 3 ZAP
SH1	2609474M01	0109038A80	SHIELD LNA ZAP
SH12	2609481M03	0109038A80	SHIELD LOGIC 1 ZAP
SH14	2609484M01	0109038A80	SHIELD LOGIC 4 ZAP
SH2	2609475M01	0109038A80	SHIELD PA ZAP
SH3	2609476M01	0109038A80	SHIELD GIF/SYN ZAP
SH4	2609477M01	0109038A80	SHIELD EXCITER ZAP
U00101	5109920D12	0109040A42	IC DC-DC CONV INVDBLR 682EOA
U00340	5109632D91	0109040A42	IC CUST PAC SC79948DTB 14TSSOP
U00370	5109879E12	0109040A42	IC BICMOS TIC 6.1 14TSSOP
U00403	5109923D14	0109040A42	IC CUST RF PS INTRFC SDC5100T1

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U00500	5199374C02	0109040A42	IC MASK DSP FIRESTORM 5013BT
U00701	5109841C42	0109040A42	IC MCU 68338 144BGA
U00702	5109509A16	0109040A42	IC SRAM 64KX16 KM616FS1000 BGA
U00704	5199342A01	0109040A42	IC FLASH ROM 512KX16 28F800B3
U00981	5109522E14	0109040A42	IC 2-INPUT OR GATE TC7S32FU
U220	5109632D92	0109038A80	IC CUST GIFSYN 5.2 F2KHAA9712
U301	4809527E31	0109038A80	TSTR NPN DUAL PHEMP 16TSSOP
U401	5109572E04	0109038A80	IC GAAS RF SW DPDT MS098
U703	5109962C11	0109038A80	IC ASIC BIC 4.2 SCS38138EC11
U705	5199301A01	0109038A80	IC EEPROM SPCL 8KX8 28BV64
U707	5199249A01	0109038A80	IC ROM LAZER D SSN DS2401P
U708	5109522E23	0109038A80	IC SNGL INV GATE TC7SH04FU
U709	5109522E30	0109038A80	IC BILAT SW QUAD TC74HC4066
U710	5109512F02	0109038A80	IC VOLT REG 2.7V LP2981 5SOT
U711	5109522E34	0109038A80	IC SNGL + GATE TC7SH08FU
U712	5109817F22	0109038A80	IC COMPTR LMC7221 SOT23
U900	5109923D38	0109038A80	IC CUST BICMOS GCAP LT 48QFP
U902	5109781E50	0109038A80	IC LIN 5V REG LM2970 SOT23
U980	5109152M07	0109040A42	IC EEPROM ANALOG ISD33180C2020
U982	5109731C03	0109038A80	IC OP AMP SSOP8 TA75W01FU
VR0354	4809877C04	0109040A42	DIODE VARACTOT SMV1104-36
VR0502	4809788E08	0109040A42	DIODE ZENER 8.2V UDZTE178.2B
VR0601	4813832P75	0109040A42	TRANS SUP QUAD 6.8 V
VR0802	4813830M74	0109040A42	DIODE DUAL 6.8V COM ANODE
VR1	4809788E11	0109040A38	DIODE ZENER 9.1V UDZ9.1B SOD
VR353	4809877C06	0109032A85	DIODE VARACTOR SMV1104-33
VR501	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
VR602	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
VR609	4813830M74	0109038A80	DIODE DUAL 6.8V COM ANODE
VR801	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
VR803	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
Y701	4809995L05	0109038A80	XTAL QUARTZ 32.768KHZ CC4V-T1
Y702	4809612J19	0109038A80	XTAL 13MHZ 11PPM SMD 5X7 MM
	0109032A86	0102701T17	SMT PARTS XCVR BD DCS ZAP BACK
	0109038A80	0102701T17	SMT PARTS BACK FIRESTORM
	0109032A85	0102701T25	SMT PARTS XCVR BD DCS ZAP FRNT
	0109040A42	0102701T25	SMT PARTS XCVR ZAP FIRE FRNT
	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
	0909423M03	0109040A38	RECPT INTRBD 2X16 POS 1MM SMD
	5402282T01	0109040A38	KEYPAD FCS LABEL
	1161	S8323A	PE - BEUTEL 130X250MM
	5402505T01	S8323A	LBL COMBI MOD/ZAP/STAC
	5409397M08	S8323A	LBL FLIP BLK CD920
	5602702Z06	S8323A	CTN REPL GSM XCVR MODULUS
	SUG1165E	S8323A	XCVR CD920 EFR SW04.29
	8509397T01	SAG4013A	ANT STUBBY ZAP
	0309315B03	SHN6607B	SCR METRIC TYPE PT
	0509391M02	SHN6607B	GROMMET MIC
	1109108J01	SHN6607B	TAPE CRISTAL LARGE
	1109108U01	SHN6607B	ADHESIVE SPEAKER PAD
	3209003J01	SHN6607B	GASKET ALERT 12MM
	3809357M02	SHN6607B	KYPD PLASTIC BOM SIP
	5009076E12	SHN6607B	SPKR DYN EARPC 20MM WIRE/LEADS
	5102543T01	SHN6607B	MIC PANASINIC = 5009536H15

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	5402374T01	SHN6607B	FCS LBL GSM MOD REAR HSGTRVL
	5402525T01	SHN6607B	LABEL COMPOSITE TXCVR
	6009223J03	SHN6607B	BATT COIN LITH BACKUP
	1109340M01	SHN6615A	ADHESIVE LENS ZAP
	5409312U01	SHN6615A	LBL LINER LENS PROTECTIVE
	6109334M01	SHN6615A	LENS ZAP
	3209003J01	SHN6616A	GASKET ALERT 12MM
	5409158T10	SHN6616A	DECAL REAR BLK DOMES
	0102701T17	SRG4001F	ZAP DB FIRESTORM PARTS BACK
	0102701T25	SRG4001F	ZAP FIRESTORM P15 PARTS FRONT
	5402139T02	SRG4001F	ESN COMPOSITE LABEL SET
	5402287T01	SRG4001F	SMT IDENT LABEL
	CDLN4279A	SUG1165E	UNIQUE HSG KIT ZAP FRNT BLK
	CDLN4282B	SUG1165E	UNIQUE HSG KIT ZAP REAR BLK
	SAG4013A	SUG1165E	ANTENNA GSM/DCS ZAP
	SHN6607B	SUG1165E	H&H ZAP
	SHN6615A	SUG1165E	HSNG & HDW FRONT ZAP
	SHN6616A	SUG1165E	HSNG REAR ZAP
	SRG4001F	SUG1165E	XCVR CD920 EFR SW04.29
	SYN6933C	SUG1165E	KYBD ZAP HOLOGRAPHIC
	0109040A38	SYN6933C	SMT PART KYPD FP-ZAP V02
	1404816Z03	SYN6933C	INSULATOR KYPD BD
	1509433M01	SYN6933C	PLASTIC LIGHT GUIDE LCD
	4003959S02	SYN6933C	SW ARRAY KYPD SNAP DOMES ZAP
	5402287T01	SYN6933C	SMT IDENT LABEL
	7209294M08	SYN6933C	LCD DSPL MOD 96X32PIX ZAP

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Schematic Symbol	Component	Intermediate	Description
A1	3909155T01	0109038A80	CNTCT ANT ZAP
BT700	0909888M01	0109038A80	RECEPT XDCC SMD
C00001	2113743A19	0109036A75	CAP CHIP .100 UF 10% X7R
C00002	2113743A19	0109036A75	CAP CHIP .100 UF 10% X7R
C00003	2113743A19	0109036A75	CAP CHIP .100 UF 10% X7R
C00004	2113743A19	0109036A75	CAP CHIP .100 UF 10% X7R
C00005	2113743A19	0109036A75	CAP CHIP .100 UF 10% X7R
C00102	2311049A54	0109040A42	CAP TAN CHIP A/P 3.3 20 16
C00103	2311049A54	0109040A42	CAP TAN CHIP A/P 3.3 20 16
C00104	2311049A56	0109040A42	CAP TAN CHIP A/P 4.7 20 10
C00107	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00201	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00203	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00205	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00206	2113743N07	0109040A42	CAP CHIP 1.5 PF +/- .25PF COG
C00207	2113743N35	0109040A42	CAP CHIP 24.0 PF 5% COG
C00208	2113743N16	0109040A42	CAP CHIP 3.9 PF +/- .25PF COG
C00209	2113740L12	0109040A42	CAP CER CHIP 5.6 PF +/- 0.1PF
C00210	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00211	2113740L12	0109040A42	CAP CER CHIP 5.6 PF +/- 0.1PF
C00212	2113743N32	0109040A42	CAP CHIP 18.0 PF 5% COG
C00213	2113740L12	0109040A42	CAP CER CHIP 5.6 PF +/- 0.1PF
C00216	2113743N09	0109040A42	CAP CHIP 2.0 PF +/- .25PF COG
C00234	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00235	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00239	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00244	2113743N40	0109038A80	CAP CHIP 39.0 PF 5% COG
C00247	2113740A67	0109040A42	CAP CHIP REEL CL1 +/-30 330
C00250	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00251	2109622N16	0109040A42	CAP CER CHIP NPO CLASS I
C00252	2109622N16	0109040A42	CAP CER CHIP NPO CLASS I
C00271	2113743L41	0109032A86	CAP CHIP 10000 PF 10% X7R
C00301	2113741F49	0109040A42	CAP CHIP CL2 X7R REEL 10000
C00304	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00314	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00317	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00318	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00322	2113743N40	0109038A80	CAP CHIP 39.0 PF 5% COG
C00337	2113743N42	0109038A80	CAP CHIP 47.0 PF 5% COG
C00340	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00341	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00342	2113743L01	0109040A42	CAP CHIP 220 PF 10% X7R
C00343	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00344	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00345	2113743L01	0109040A42	CAP CHIP 220 PF 10% X7R
C00346	2113743L01	0109040A42	CAP CHIP 220 PF 10% X7R
C00350	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00353	2113743N18	0109040A42	CAP CHIP 4.7 PF +/- .25PF COG
C00360	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00361	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00362	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00363	2113743N40	0109038A80	CAP CHIP 39.0 PF 5% COG
C00364	2113740F39	0109040A42	CAP CHIP REEL CL1 +/-30 33
C00365	2113743M08	0109040A42	CAP CHIP 22000 PF +80-20% Y5V

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Schematic Symbol	Component	Intermediate	Description
C00367	2113743N18	0109040A42	CAP CHIP 4.7 PF +- .25PF COG
C00370	2113743N50	0109040A42	CAP CHIP 100 PF 5% COG
C00371	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00372	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00373	2113743N40	0109040A42	CAP CHIP 39.0 PF 5% COG
C00374	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00375	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00376	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00377	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00378	2113740F57	0109040A42	CAP CHIP REEL CL1 +/-30 180
C00379	2109622N16	0109040A42	CAP CER CHIP NPO CLASS I
C00380	2113743E11	0109040A42	CAP CHIP .039 UF 10% X7R
C00409	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00410	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00420	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00421	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00422	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00453	2113740F11	0109040A42	CAP CHIP REEL CL1 +/-30 2.2
C00460	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00461	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00462	2113743N46	0109040A42	CAP CHIP 68.0 PF 5% COG
C00468	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00469	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00470	2113743N12	0109040A42	CAP CHIP 2.7 PF +- .25PF COG
C00481	2113740F27	0109040A42	CAP CHIP REEL CL1 +/-30 10
C00482	2113743L41	0109040A42	CAP CHIP 10000 PF 10% X7R
C00505	2113743N34	0109040A42	CAP CHIP 22.0 PF 5% COG
C00524	2113743N54	0109040A42	CAP CHIP 150 PF 5% COG
C00525	2113743N36	0109040A42	CAP CHIP 27.0 PF 5% COG
C00530	2113743N54	0109040A42	CAP CHIP 150 PF 5% COG
C00536	2113740F61	0109040A42	CAP CHIP REEL CL1 +/-130 270
C00537	2113743L05	0109040A42	CAP CHIP 330 PF 10% X7R
C00538	2113741F29	0109040A42	CAP CHIP CL2 X7R REEL 1500
C00550	2113743N54	0109040A42	CAP CHIP 150 PF 5% COG
C00551	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00552	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00553	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00554	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00555	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00556	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00557	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00558	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00559	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00560	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00561	2113743G26	0109040A42	CAP CHIP 4.7 UF 16V +80-20%
C00562	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00563	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00564	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00565	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00605	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00612	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00702	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00704	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00705	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R

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C00708	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00715	2113743L25	0109040A42	CAP CHIP 2200 PF 10% X7R
C00716	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00750	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00751	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00752	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00753	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00754	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00755	2113743E12	0109040A42	CAP CHIP .047 UF 10% X7R
C00806	2113743L17	0109040A42	CAP CHIP 1000 PF 10% X7R
C00810	2113743A27	0109040A42	CAP CHIP .470 UF 10% 16V
C00812	2311049A56	0109040A42	CAP TAN CHIP A/P 4.7 20 10
C00816	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00850	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00858	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00860	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00861	2113743N38	0109040A42	CAP CHIP 33.0 PF 5% COG
C00901	2311049C17	0109040A42	CAP TANT CHIP 10 UF 16V 10%
C00902	2113743H14	0109040A42	CAP CHIP 10.0 UF 16V +80-20%
C00903	2113743H14	0109040A42	CAP CHIP 10.0 UF 16V +80-20%
C00904	2113743N26	0109040A42	CAP CHIP 10.0 PF 5% COG
C00905	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00907	2113928J08	0109040A42	CAP CERAMIC CHIP 10.0UF
C00908	2113743H14	0109040A42	CAP CHIP 10.0 UF 16V +80-20%
C00909	2113743E20	0109040A42	CAP CHIP .10 UF 10%
C00913	2113928J08	0109040A42	CAP CERAMIC CHIP 10.0UF
C00914	2113743L11	0109040A42	CAP CHIP 560 PF 10% X7R
C00915	2113928J08	0109040A42	CAP CERAMIC CHIP 10.0UF
C00916	2311049C16	0109040A42	CAP TANT CHIP 68 UF 10V 10%
C00977	2113743N05	0109040A42	CAP CHIP 1.2 PF +- .25PF COG
C00980	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00981	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00983	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00984	2113743M24	0109040A42	CAP CHIP 100000 PF +80-20% Y5V
C00986	2113743F16	0109040A42	CAP CHIP 1.0 UF 16V +80-20%
C105	2113743G26	0109032A85	CAP CHIP 4.7 UF 16V +80-20%
C108	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C11	2113743L01	0109036A75	CAP CHIP 220 PF 10% X7R
C12	2113743L01	0109036A75	CAP CHIP 220 PF 10% X7R
C14	2113743N26	0109036A75	CAP CHIP 10.0 PF 5% COG
C15	2113743M24	0109036A75	CAP CHIP 100000 PF +80-20% Y5V
C200	2113743N07	0109032A85	CAP CHIP 1.5 PF +- .25PF COG
C202	2113743N32	0109032A85	CAP CHIP 18.0 PF 5% COG
C204	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C214	2113743L17	0109032A85	CAP CHIP 1000 PF 10% X7R
C217	2113743N14	0109032A85	CAP CHIP 3.3 PF +- .25PF COG
C218	2113743N69	0109032A85	CAP CHIP 1.8PF 16V +/- .25PF
C220	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C221	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C222	2113743N28	0109038A80	CAP CHIP 12.0 PF 5% COG
C223	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C224	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C225	2113740F67	0109038A80	CAP CHIP CL1 +/-30 470 5%
C226	2109622N09	0109038A80	CAP CER CHIP NPO CLASS I

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C227	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C228	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C229	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C230	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C231	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C232	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C233	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C236	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C237	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C238	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C240	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C241	2113743N46	0109038A80	CAP CHIP 68.0 PF 5% COG
C242	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C243	2113743G26	0109038A80	CAP CHIP 4.7 UF 16V +80-20%
C246	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C248	2113740A79	0109038A80	CAP CHIP REEL CL1 +/-30 1000
C249	2113743N03	0109038A80	CAP CHIP 1.0 PF +-.25PF COG
C253	2311049A56	0109038A80	CAP TAN CHIP A/P 4.7 20 10
C254	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C255	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C256	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C257	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C259	2113743G26	0109038A80	CAP CHIP 4.7 UF 16V +80-20%
C260	2113743N10	0109038A80	CAP CHIP 2.2 PF +-.25PF COG
C261	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C262	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C263	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C264	2311049A56	0109038A80	CAP TAN CHIP A/P 4.7 20 10
C265	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C266	2113743N32	0109038A80	CAP CHIP 18.0 PF 5% COG
C267	2113740F67	0109038A80	CAP CHIP CL1 +/-30 470 5%
C268	2113743N54	0109038A80	CAP CHIP 150 PF 5% COG
C269	2109622N09	0109038A80	CAP CER CHIP NPO CLASS I
C299	2113743N10	0109040A42	CAP CHIP 2.2 PF +-.25PF COG
C300	2113928J08	0109038A80	CAP CERAMIC CHIP 10.0UF
C302	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C306	2113740F09	0109038A80	CAP CHIP REEL CL1 +/-30 1.8
C307	2113740L09	0109038A80	CAP CER CHIP 4.3 PF +-0.1PF
C308	2113743N14	0109038A80	CAP CHIP 3.3 PF +-.25PF COG
C309	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C310	2113740F11	0109038A80	CAP CHIP REEL CL1 +/-30 2.2
C311	2113740L10	0109032A86	CAP CER CHIP 4.7 PF +-0.1PF
C312	2113742C30	0109038A80	CAP CER CHP 4.7PF +-.25PF 100V
C313	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C315	2113743N10	0109038A80	CAP CHIP 2.2 PF +-.25PF COG
C319	2113743N50	0109032A86	CAP CHIP 100 PF 5% COG
C320	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C321	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C323	2113743N30	0109032A85	CAP CHIP 15.0 PF 5% COG
C324	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C326	2113743N36	0109032A85	CAP CHIP 27.0 PF 5% COG
C327	2113743N24	0109038A80	CAP CHIP 8.2 PF + -.5PF COG
C330	2113743N24	0109038A80	CAP CHIP 8.2 PF + -.5PF COG
C331	2113743N10	0109038A80	CAP CHIP 2.2 PF +-.25PF COG

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C333	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C335	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C338	2113743N20	0109038A80	CAP CHIP 5.6 PF + -.5PF COG
C347	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C349	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C351	2113743L25	0109032A85	CAP CHIP 2200 PF 10% X7R
C354	2113743N10	0109032A85	CAP CHIP 2.2 PF +-.25PF COG
C355	2113743N22	0109032A85	CAP CHIP 6.8 PF + -.5PF COG
C356	2113740L20	0109032A85	CAP 12.0 PF 50V 2.0 %
C357	2113743L17	0109032A85	CAP CHIP 1000 PF 10% X7R
C359	2113743N20	0109040A42	CAP CHIP 5.6 PF + -.5PF COG
C366	2113743L41	0109032A85	CAP CHIP 10000 PF 10% X7R
C369	2113743N07	0109038A80	CAP CHIP 1.5 PF +-.25PF COG
C381	2311049B04	0109038A80	CAP TANT CHIP 4.7 UF 10V 10%
C382	2113743N69	0109032A85	CAP CHIP 1.8PF 16V +/- .25PF
C383	2113743L41	0109032A85	CAP CHIP 10000 PF 10% X7R
C384	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C385	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C388	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C389	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C390	2113743N01	0109038A80	CAP CHIP 0.5 PF +-.25PF COG
C391	2113743N02	0109038A80	CAP CHIP 0.75 PF +-.25PF COG
C392	2113743L05	0109038A80	CAP CHIP 330 PF 10% X7R
C393	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C394	2113743N18	0109038A80	CAP CHIP 4.7 PF +-.25PF COG
C395	2113740F19	0109038A80	CAP CHIP REEL CL1 +/-30 4.7
C397	2113743N34	0109032A86	CAP CHIP 22.0 PF 5% COG
C399	2113743N36	0109032A85	CAP CHIP 27.0 PF 5% COG
C402	2113743N18	0109038A80	CAP CHIP 4.7 PF +-.25PF COG
C403	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C408	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C411	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C412	2113743N10	0109038A80	CAP CHIP 2.2 PF +-.25PF COG
C413	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C415	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C416	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C417	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C418	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C419	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C430	2113743L41	0109032A86	CAP CHIP 10000 PF 10% X7R
C432	2113743N08	0109038A80	CAP CHIP 1.6 PF +-.25PF COG
C433	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C435	2113743L41	0109032A86	CAP CHIP 10000 PF 10% X7R
C436	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C437	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C438	2113743N50	0109032A86	CAP CHIP 100 PF 5% COG
C439	2113743N50	0109032A86	CAP CHIP 100 PF 5% COG
C440	2113743N12	0109032A86	CAP CHIP 2.7 PF +-.25PF COG
C463	2113740F13	0109040A42	CAP CHIP REEL CL1 +/-30 2.7
C600	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C601	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C602	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C603	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C604	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG

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C606	2113743N50	0109038A80	CAP CHIP 100 PF 5% COG
C607	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C608	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C610	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C611	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C614	2113743N36	0109038A80	CAP CHIP 27.0 PF 5% COG
C620	2113743L21	0109038A80	CAP CHIP 1500 PF 10% X7R
C701	2113740F19	0109038A80	CAP CHIP REEL CL1 +/-30 4.7
C703	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C706	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C709	2113743E07	0109038A80	CER CHIP CAP .022UF
C710	2113743N54	0109038A80	CAP CHIP 150 PF 5% COG
C711	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C712	2113743E07	0109038A80	CER CHIP CAP .022UF
C714	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C717	2113743N34	0109038A80	CAP CHIP 22.0 PF 5% COG
C759	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C760	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C761	2113743E12	0109038A80	CAP CHIP .047 UF 10% X7R
C763	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C791	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C792	2113743N30	0109038A80	CAP CHIP 15.0 PF 5% COG
C802	2113928J08	0109038A80	CAP CERAMIC CHIP 10.0UF
C803	2113743A19	0109038A80	CAP CHIP .100 UF 10% X7R
C804	2113741F21	0109038A80	CAP CHIP CL2 X7R REEL 680
C805	2113743A19	0109038A80	CAP CHIP .100 UF 10% X7R
C808	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C809	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C811	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C813	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C815	2113741F49	0109038A80	CAP CHIP CL2 X7R REEL 10000
C817	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C818	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C819	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C820	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C821	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C822	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C825	2113743E20	0109038A80	CAP CHIP .10 UF 10%
C826	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C827	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C830	2113743N08	0109038A80	CAP CHIP 1.6 PF +/- .25PF COG
C831	2113743N13	0109038A80	CAP CHIP 3.0 PF +/- .25PF COG
C834	2113743N18	0109038A80	CAP CHIP 4.7 PF +/- .25PF COG
C835	2113743N26	0109038A80	CAP CHIP 10.0 PF 5% COG
C837	2113743N24	0109038A80	CAP CHIP 8.2 PF +/- .5PF COG
C838	2113743N38	0109038A80	CAP CHIP 33.0 PF 5% COG
C906	2113743H14	0109038A80	CAP CHIP 10.0 UF 16V +80-20%
C910	2113928J08	0109038A80	CAP CERAMIC CHIP 10.0UF
C911	2311049A56	0109038A80	CAP TAN CHIP A/P 4.7 20 10
C912	2113743L41	0109038A80	CAP CHIP 10000 PF 10% X7R
C918	2113743N12	0109038A80	CAP CHIP 2.7 PF +/- .25PF COG
C919	2113743N12	0109038A80	CAP CHIP 2.7 PF +/- .25PF COG
C920	2113743G26	0109038A80	CAP CHIP 4.7 UF 16V +80-20%
C923	2113743N12	0109038A80	CAP CHIP 2.7 PF +/- .25PF COG

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Schematic Symbol	Component	Intermediate	Description
C953	2113743N26	0109032A86	CAP CHIP 10.0 PF 5% COG
C967	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C982	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C990	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C993	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C995	2113743L11	0109038A80	CAP CHIP 560 PF 10% X7R
C996	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C997	2113743M24	0109038A80	CAP CHIP 100000 PF +80-20% Y5V
C998	2113743L17	0109038A80	CAP CHIP 1000 PF 10% X7R
C999	2113741F33	0109038A80	CAP CHIP CL2 X7R REEL 2200
CR0202	4809641F02	0109040A42	DIODE VCTR ABRUPT SMD SOD232
CR0203	4809948D22	0109040A42	DIODE PIN BAR65-02W SCD-80
CR0308	4809948D22	0109040A42	DIODE PIN BAR65-02W SCD-80
CR0505	4813830M74	0109040A42	DIODE DUAL 6.8V COM ANODE
CR0604	4809653F07	0109040A42	RECT SCHTTKY 1A MBRM120ET3
CR0710	4809118D01	0109040A42	LED BICOLOR LNJ107W5PRA1
CR1	4809606E02	0109036A75	DIODE DUAL ARRAY DAN222
CR2	4813832P75	0109036A75	TRANS SUP QUAD 6.8 V
CR220	4809641F02	0109038A80	DIODE VCTR ABRUPT SMD SOD232
CR221	4809641F04	0109038A80	DIODE VCTR SMV1204-70 SOT23
CR223	4809948D05	0109032A86	DIODE RF SWITCH SMT SOD323
CR261	4809641F02	0109038A80	DIODE VCTR ABRUPT SMD SOD232
CR3	4813832P75	0109036A75	TRANS SUP QUAD 6.8 V
CR301	4809948D22	0109032A86	DIODE PIN BAR65-02W SCD-80
CR302	4809948D22	0109032A86	DIODE PIN BAR65-02W SCD-80
CR303	4809948D10	0109038A80	DIODE PIN BAR63-03
CR304	4809948D13	0109032A86	DIODE RF SWITCH BA892 ESC
CR306	4809948D13	0109032A86	DIODE RF SWITCH BA892 ESC
CR307	4809948D13	0109032A86	DIODE RF SWITCH BA892 ESC
CR501	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR502	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR503	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR504	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR601	4809606E02	0109040A42	DIODE DUAL ARRAY DAN222
CR602	4809606E07	0109038A80	DIODE DUAL ARRAY DA221
CR605	4809653F07	0109038A80	RECT SCHTTKY 1A MBRM120ET3
CR607	4809606E07	0109038A80	DIODE DUAL ARRAY DA221
CR608	4809606E02	0109038A80	DIODE DUAL ARRAY DAN222
CR702	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR703	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR704	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR705	4809924D11	0109040A42	DIODE SCHTTKY DUAL RB717F SOT
CR706	4809606E08	0109040A42	DIODE DUAL SCHOTTKY RB715F
CR903	4809653F07	0109038A80	RECT SCHTTKY 1A MBRM120ET3
CR910	4809653F07	0109038A80	RECT SCHTTKY 1A MBRM120ET3
DS1	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T
DS101	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS102	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS103	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS104	4809938N10	0109038A80	LED CHIP YEL/GRN LNJ312G8T
DS2	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T
DS3	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T
DS4	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T
DS5	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T

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DS6	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T
DS7	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T
DS8	4809938N10	0109036A75	LED CHIP YEL/GRN LNJ312G8T
FL0480	9109035M01	0109040A42	FLTR SAW BP 215MHZ SMD
FL301	9109193T05	0109038A80	FLTR CER LP 897/1747MHZ SMD
FL400	9109144M01	0109038A80	FLTR CER RX 900MHZ SMD
FL401	9109111C08	0109032A86	FLTR CER 1800 MHZ SMD
FL461	9109157M01	0109038A80	FLTR SAW RX+LO 947/727 SMD
FL462	9109429J04	0109032A86	FLTR CER RX-LO1800MHZ SMD
J00500	2809424M01	0109040A42	HDR INTRBRD CONN 2X16 ZAP
J00501	0909423M03	0109036A75	RECPT INTRBD 2X16 POS 1MM SMD
J00502	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00503	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00504	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00505	3909173T01	0109040A42	CNTCT PCB SMD ZAP
J00803	0909888M04	0109040A42	RECEPT XDCR SMD
J0803A	3909301S02	0109040A42	CNTCT BATT PCB ZAPPA
J0803B	3909301S02	0109040A42	CNTCT BATT PCB ZAPPA
J506	3909173T01	0109038A80	CNTCT PCB SMD ZAP
J507	3909173T01	0109038A80	CNTCT PCB SMD ZAP
J600	0909449B03	0109038A80	RECEPT MODULE 15 PIN SMD
J603	0909888M01	0109038A80	RECEPT XDCR SMD
J802	0909195E01	0109038A80	SKT BOT ENTRY 2 POS
J900	3909426M01	0109038A80	CNTCT BLK SIM CARD READER ZAP
L00201	2409154M88	0109040A42	IND CER MLTILYR 10.0NH 1005
L00203	2409154M96	0109040A42	IND CER MLTILYR 47.0NH 1005
L00204	2409154M91	0109040A42	IND CER MLTILYR 18.0NH 1005
L00205	2409154M38	0109040A42	IND CER MLTILYR 15.0NH 1005
L00222	2462587Q03	0109040A42	IND CHIP 82 NH 20%
L00226	2462587Q36	0109040A42	IND CHIP 120 NH 10%
L00301	2409154M84	0109032A86	IND CER MLTILYR 4.7 NH 1005
L00350	2409154M37	0109040A42	IND CER MLTILYR 12.0NH 1005
L00401	2409154M38	0109040A42	IND CER MLTILYR 15.0NH 1005
L00451	2409646M30	0109040A42	IND CER MULTILYR 8.2NH 1608
L00460	2409646M28	0109040A42	IND CER MULTILYR 5.6NH 1608
L00461	2409646M70	0109040A42	IND CER MULTILYR 56NH 1608
L00462	2409646M26	0109040A42	IND CER MULTILYR 3.9NH 1608
L00465	2409646M44	0109040A42	IN CER MULTILYR
L00498	2409646M72	0109040A42	IND CER MULTILYR 82NH 1608
L00520	2462587P36	0109040A42	CHIP IND 100000 NH
L202	2409154M96	0109038A80	IND CER MLTILYR 47.0NH 1005
L206	2409154M83	0109032A85	IND CER MLTILYR 3.9 NH 1005
L207	2409154M96	0109038A80	IND CER MLTILYR 47.0NH 1005
L220	2409257L15	0109038A80	IND CHIP MLTLYR 18 NH 1608
L221	2409704K50	0109038A80	IND CHIP MULTILYR 120NH 2012
L223	2462587Q35	0109038A80	IND CHIP 100 NH 10%
L224	2409257L18	0109032A86	IND CHIP MLTLYR 33 NH 1608
L225	2409646M37	0109038A80	IND CER MULTILYR 33NH 1608
L261	2409377M08	0109038A80	IND CHIP WW 22 NH 5% 1608
L303	2409154M62	0109032A86	IND CER MTLILYR 8.2 NH 1005
L304	2409154M60	0109038A80	IND CER MTLILYR 5.6 NH 1005
L309	2409646M93	0109038A80	IN CER MULTILYR 3.3NH 1608
L310	2409154M87	0109038A80	IND CER MLTILYR 8.2 NH 1005
L332	2409134J27	0109038A80	IND CHIP FER FLTR 1000 0402

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L351	2409154M83	0109038A80	IND CER MLTILYR 3.9 NH 1005
L367	2409154M84	0109040A42	IND CER MLTILYR 4.7 NH 1005
L402	2409154M60	0109038A80	IND CER MTLILYR 5.6 NH 1005
L410	2409646M30	0109038A80	IND CER MULTILYR 8.2NH 1608
L411	2409646M56	0109038A80	IN CER MULTILYR 10 NH 1608
L413	2409646M81	0109038A80	IN CER MULTILYR 10 NH 1608
L430	2409154M81	0109032A86	IND CER MLTILYR 2.7 NH 1005
L902	2503788S10	0109038A80	IND PWR 33 UH 20% 0.58A D01608
PCB	8409433U06	0109036A75	PCB KYBD FLAT ZAP
PCB	8409261U15	0109040A42	PCB ZAP TSOP XCVR
Q00109	4809605E02	0109040A42	TSTR SIG NPN 2SC4617
Q00111	4809605E05	0109040A42	TSTR SIG NPN 2SD1664 SOT89
Q00201	4809527E24	0109040A42	TSTR NPN RF MRF949LT1 SC-90
Q00202	4809527E24	0109040A42	TSTR NPN RF MRF949LT1 SC-90
Q00206	4809527E24	0109040A42	TSTR NPN RF MRF949LT1 SC-90
Q00301	4809579E17	0109040A42	TSTR MOSFET P-CHAN SI9424
Q00305	4809939C06	0109040A42	TSTR DUAL PNP/NPN UMZ2N
Q00351	4809940E01	0109040A42	TSTR NPN MRF947 A/P
Q00460	4809527E20	0109040A42	TSTR NPN RF 2SC4784 SC70
Q00480	4809940E01	0109040A42	TSTR NPN MRF947 A/P
Q00501	4809607E05	0109040A42	TSTR PNP DTA143EE
Q00520	4809607E05	0109040A42	TSTR PNP DTA143EE
Q00602	4809939C05	0109040A42	TSTR DUAL NPN/PNP UMC 5
Q00603	4809608E03	0109040A42	TSTR DIG PNP DTA114YE
Q00604	4809607E04	0109040A42	TSTR SIG PNP 2SB1132 SOT89
Q00605	4809605E02	0109040A42	TSTR SIG NPN 2SC4617
Q00704	4809940E02	0109040A42	TSTR DIG NPN DTC114YE
Q00705	4809940E02	0109040A42	TSTR DIG NPN DTC114YE
Q00711	4809939C10	0109040A42	TSTR DUAL PNP/PNP UMT1N
Q0412	4809939C07	0109032A86	TSTR DUAL PNP/PNP UMA4NTL
Q1	4809607E02	0109036A75	TSTR SIG PNP 25A1774
Q100	4809939C05	0109032A85	TSTR DUAL NPN/PNP UMC 5
Q100	4809605E05	0109036A75	TSTR SIG NPN 2SD1664 SOT89
Q101	4809605E02	0109036A75	TSTR SIG NPN 2SC4617
Q105	4809608E03	0109032A85	TSTR DIG PNP DTA114YE
Q2	4809607E02	0109036A75	TSTR SIG PNP 25A1774
Q200	4809527E30	0109032A85	TSTR NPN RF NE68719 SC90
Q205	4809939C07	0109032A85	TSTR DUAL PNP/PNP UMA4NTL
Q220	4809605E02	0109038A80	TSTR SIG NPN 2SC4617
Q221	4809579E18	0109038A80	TSTR MOSFET P-CHAN TP0101T
Q222	4809579E18	0109038A80	TSTR MOSFET P-CHAN TP0101T
Q300	4809939C12	0109040A42	TSTR DUAL NPN/NPN UPA806T-T1
Q304	4809939C07	0109032A85	TSTR DUAL PNP/PNP UMA4NTL
Q306	4809939C06	0109032A85	TSTR DUAL PNP/NPN UMZ2N
Q309	4809939C07	0109032A85	TSTR DUAL PNP/PNP UMA4NTL
Q330	4809527E26	0109038A80	TSTR NPN RF 25C5081 SOT343
Q331	4809527E24	0109038A80	TSTR NPN RF MRF949LT1 SC-90
Q350	4809940E01	0109032A85	TSTR NPN MRF947 A/P
Q410	4809527E30	0109038A80	TSTR NPN RF NE68719 SC90
Q411	4809527E24	0109038A80	TSTR NPN RF MRF949LT1 SC-90
Q430	4809527E32	0109032A86	TSTR NPN RF BFP320W
Q431	4809527E24	0109032A86	TSTR NPN RF MRF949LT1 SC-90
Q601	4809579E04	0109038A80	TSTR MOSFET P-CHAN SI9434DY
Q701	4809605E02	0109038A80	TSTR SIG NPN 2SC4617

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Q702	4809940E03	0109038A80	TSTR DIG NPN DTC114TE
Q703	4813824M33	0109038A80	TSTR NPN 60V .6A GEN PURP
Q706	4809605E02	0109038A80	TSTR SIG NPN 2SC4617
Q709	4809608E03	0109038A80	TSTR DIG PNP DTA114YE
Q905	4809939C10	0109038A80	TSTR DUAL PNP/PNP UMT1N
Q906	4809579E17	0109038A80	TSTR MOSFET P-CHAN SI9424
Q907	4809939C05	0109038A80	TSTR DUAL NPN/PNP UMC 5
R00103	0660076N55	0109036A75	RES CHIP 1800 OHM 1/16 W
R00109	0660076N93	0109036A75	RES CHIP 68 K OHM 1/16 W
R00118	0660076N03	0109040A42	RES CHIP 12 OHM 5 1/8W
R00121	0662057M80	0109040A42	RES. CHIP 1800 5% 20X40
R00202	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00203	0662057M54	0109040A42	RES. CHIP 150 5% 20X40
R00204	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00205	0662057M84	0109040A42	RES. CHIP 2700 5% 20X40
R00206	0662057M52	0109040A42	RES. CHIP 120 5% 20X40
R00207	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00209	0662057M34	0109040A42	RES. CHIP 22 5% 20X40
R00210	0662057M78	0109040A42	RES. CHIP 1500 5% 20X40
R00211	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00212	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00213	0662057M80	0109040A42	RES. CHIP 1800 5% 20X40
R00214	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00227	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00229	0662057M38	0109040A42	RES CHIP 33 5% 20X40
R00232	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00233	0662057M38	0109040A42	RES CHIP 33 5% 20X40
R00234	0662057M84	0109040A42	RES. CHIP 2700 5% 20X40
R00245	0662057M68	0109040A42	RES. CHIP 560 5% 20X40
R00301	0662057M62	0109040A42	RES. CHIP 330 5% 20X40
R00302	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00305	0662057M76	0109040A42	RES. CHIP 1200 5% 20X40
R00306	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00307	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00309	0609591M43	0109032A85	RES CHIP DUAL 33K 5% 0.63W
R00313	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00316	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00318	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00318	0662057M70	0109040A42	RES. CHIP 680 5% 20X40
R00321	0662057M80	0109040A42	RES. CHIP 1800 5% 20X40
R00328	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00330	0662057M70	0109040A42	RES. CHIP 680 5% 20X40
R00331	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00335	0662057M44	0109040A42	RES CHIP 56 5% 20X40
R00337	0662057M40	0109040A42	RES. CHIP 39 5% 20X40
R00340	0662057M94	0109040A42	RES. CHIP 6800 5% 20X40
R00341	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00342	0662057M94	0109040A42	RES. CHIP 6800 5% 20X40
R00343	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00354	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00357	0662057M38	0109040A42	RES CHIP 33 5% 20X40
R00358	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00370	0662057M54	0109040A42	RES. CHIP 150 5% 20X40
R00374	0662057M26	0109040A42	RES. CHIP 10 5% 20X40

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R00377	0662057M43	0109040A42	RES. CHIP 51 5% 20X40
R00405	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00406	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00451	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00461	0662057M84	0109040A42	RES. CHIP 2700 5% 20X40
R00462	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00468	0662057M52	0109040A42	RES. CHIP 120 5% 20X40
R00480	0662057M76	0109040A42	RES. CHIP 1200 5% 20X40
R00481	0662057M82	0109040A42	RES. CHIP 2200 5% 20X40
R00482	0662057M62	0109040A42	RES. CHIP 330 5% 20X40
R00483	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00501	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00502	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00504	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00505	0662057N03	0109040A42	RES. CHIP 15K 5% 20X40
R00510	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00511	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00514	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00516	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00525	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00526	0662057M60	0109040A42	RES. CHIP 270 5% 20X40
R00555	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00601	0662057N06	0109040A42	RES. CHIP 20K 5% 20X40
R00606	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00607	0662057N11	0109040A42	RES. CHIP 33K 5% 20X40
R00608	0662057N01	0109040A42	RES CHIP 12K 5% 20X40
R00616	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00617	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00703	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00705	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00712	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00723	0662057M01	0109040A42	RES. CHIP 0 5% 20X40
R00726	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00728	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40
R00732	0662057N06	0109040A42	RES. CHIP 20K 5% 20X40
R00733	0662057M61	0109040A42	RES CHIP 300 5% 20X40
R00734	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00735	0662057M50	0109040A42	RES. CHIP 100 5% 20X40
R00736	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00739	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00740	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00741	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00742	0662057N03	0109040A42	RES. CHIP 15K 5% 20X40
R00743	0662057N03	0109040A42	RES. CHIP 15K 5% 20X40
R00753	0609591M39	0109040A42	RES CHIP DUAL 15K 5% 0.63W
R00770	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00771	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00772	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00773	0609591M37	0109040A42	RES CHIP DUAL 10K 5% 0.63W
R00774	0609591M49	0109040A42	RES CHIP DUAL 100K 5% .63W
R00775	0609591M49	0109040A42	RES CHIP DUAL 100K 5% .63W
R00776	0609591M49	0109040A42	RES CHIP DUAL 100K 5% .63W
R00777	0662057N23	0109040A42	RES. CHIP 100K 5% 20X40
R00778	0662057N15	0109040A42	RES. CHIP 47K 5% 20X40

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Schematic Symbols of Item S8324A

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Schematic Symbol	Component	Intermediate	Description
R00805	0662057N19	0109040A42	RES. CHIP 68K 5% 20X40
R00806	0662057M68	0109040A42	RES. CHIP 560 5% 20X40
R00808	0662057M90	0109040A42	RES. CHIP 4700 5% 20X40
R00812	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00852	0662057M26	0109040A42	RES. CHIP 10 5% 20X40
R00853	0662057M26	0109040A42	RES. CHIP 10 5% 20X40
R00920	0662057M74	0109040A42	RES. CHIP 1000 5% 20X40
R00977	0662057M76	0109040A42	RES. CHIP 1200 5% 20X40
R00984	0662057M98	0109040A42	RES. CHIP 10K 5% 20X40
R00985	0609591M42	0109040A42	RES CHIP DUAL 27K 5% 0.63W
R100	0699200A13	0109036A75	RES CHIP DUAL 33 5% 0603
R102	0609591M07	0109038A80	RES CHIP DUAL 33 5% 0.63W
R103	0609591M07	0109038A80	RES CHIP DUAL 33 5% 0.63W
R104	0660076N01	0109036A75	RES CHIP 10 OHM 5 1/16W
R105	0660076N05	0109036A75	RES CHIP 15 OHM 5 1/16
R106	0662057N11	0109032A85	RES. CHIP 33K 5% 20X40
R106	0699200A13	0109036A75	RES CHIP DUAL 33 5% 0603
R107	0662057N11	0109032A85	RES. CHIP 33K 5% 20X40
R107	0699200A13	0109036A75	RES CHIP DUAL 33 5% 0603
R108	0699200A13	0109036A75	RES CHIP DUAL 33 5% 0603
R110	0662057M62	0109032A85	RES. CHIP 330 5% 20X40
R111	0662057M98	0109032A85	RES. CHIP 10K 5% 20X40
R14	0660076N93	0109036A75	RES CHIP 68 K OHM 1/16 W
R18	0660076P03	0109036A75	RES CHIP 120K OHM 5 1/8W
R200	0662057M38	0109032A85	RES CHIP 33 5% 20X40
R215	0662057M76	0109032A85	RES. CHIP 1200 5% 20X40
R216	0662057M90	0109032A85	RES. CHIP 4700 5% 20X40
R217	0662057M85	0109032A85	RES. CHIP 3000 5% 20X40
R219	0662057M38	0109038A80	RES CHIP 33 5% 20X40
R220	0662057M80	0109038A80	RES. CHIP 1800 5% 20X40
R221	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R222	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R223	0662057M26	0109038A80	RES. CHIP 10 5% 20X40
R224	0662057N15	0109038A80	RES. CHIP 47K 5% 20X40
R225	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R226	0662057M38	0109038A80	RES CHIP 33 5% 20X40
R228	0662057M26	0109038A80	RES. CHIP 10 5% 20X40
R230	0662057N13	0109038A80	RES. CHIP 39K 5% 20X40
R231	0662057N29	0109038A80	RES CHIP 180K 5% 20X40
R238	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R239	0662057N17	0109038A80	RES. CHIP 56K 5% 20X40
R240	0662057M80	0109038A80	RES. CHIP 1800 5% 20X40
R241	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R242	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R243	0662057M82	0109032A85	RES. CHIP 2200 5% 20X40
R250	0662057M68	0109032A85	RES. CHIP 560 5% 20X40
R303	0662057M43	0109038A80	RES. CHIP 51 5% 20X40
R310	0662057M74	0109032A86	RES. CHIP 1000 5% 20X40
R311	0662057M70	0109032A86	RES. CHIP 680 5% 20X40
R312	0662057M70	0109032A86	RES. CHIP 680 5% 20X40
R313	0662057M43	0109032A85	RES. CHIP 51 5% 20X40
R314	0662057M78	0109032A85	RES. CHIP 1500 5% 20X40
R315	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R319	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40

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Schematic Symbol	Component	Intermediate	Description
R320	0662057M58	0109038A80	RES. CHIP 220 5% 20X40
R322	0662057M98	0109032A85	RES. CHIP 10K 5% 20X40
R324	0662057N09	0109032A85	RES. CHIP 27K 5% 20X40
R325	0662057N01	0109032A85	RES CHIP 12K 5% 20X40
R326	0662057N03	0109032A85	RES. CHIP 15K 5% 20X40
R329	0662057M78	0109032A86	RES. CHIP 1500 5% 20X40
R332	0662057M38	0109038A80	RES CHIP 33 5% 20X40
R333	0662057M92	0109038A80	RES. CHIP 5600 5% 20X40
R334	0662057M88	0109038A80	RES. CHIP 3900 5% 20X40
R336	0662057M26	0109032A85	RES. CHIP 10 5% 20X40
R339	0662057M62	0109038A80	RES. CHIP 330 5% 20X40
R349	0662057M26	0109038A80	RES. CHIP 10 5% 20X40
R351	0662057M90	0109032A85	RES. CHIP 4700 5% 20X40
R353	0662057M34	0109032A85	RES. CHIP 22 5% 20X40
R355	0662057M82	0109032A85	RES. CHIP 2200 5% 20X40
R368	0662057M78	0109032A85	RES. CHIP 1500 5% 20X40
R369	0662057M80	0109032A85	RES. CHIP 1800 5% 20X40
R371	0662057N47	0109040A42	RES. CHIP 1.0 MEG 5% 20X40
R373	0662057N47	0109040A42	RES. CHIP 1.0 MEG 5% 20X40
R410	0662057M30	0109038A80	RES. CHIP 15 5% 20X40
R411	0662057M92	0109038A80	RES. CHIP 5600 5% 20X40
R412	0662057M90	0109038A80	RES. CHIP 4700 5% 20X40
R415	0609591M33	0109038A80	RES CHIP DUAL 4.7K 5% 0.63W
R418	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R430	0662057M30	0109032A86	RES. CHIP 15 5% 20X40
R431	0609591M33	0109032A86	RES CHIP DUAL 4.7K 5% 0.63W
R432	0662057M90	0109032A86	RES. CHIP 4700 5% 20X40
R433	0662057M92	0109032A86	RES. CHIP 5600 5% 20X40
R437	0662057M54	0109032A86	RES. CHIP 150 5% 20X40
R450	0662057M01	0109032A85	RES. CHIP 0 5% 20X40
R602	0680195M64	0109038A80	RES 0.24 OHM 1/2W
R603	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R611	0609591M37	0109038A80	RES CHIP DUAL 10K 5% 0.63W
R614	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R650	0662057M90	0109038A80	RES. CHIP 4700 5% 20X40
R701	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R704	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R706	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R707	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R708	0609591M57	0109038A80	RES CHIP DUAL 470K 5% .63W
R709	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R710	0609591M49	0109038A80	RES CHIP DUAL 100K 5% .63W
R711	0609591M39	0109038A80	RES CHIP DUAL 15K 5% 0.63W
R713	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R714	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R715	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R716	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R717	0662057M78	0109038A80	RES. CHIP 1500 5% 20X40
R718	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R719	0662057M50	0109038A80	RES. CHIP 100 5% 20X40
R720	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R721	0662057M58	0109038A80	RES. CHIP 220 5% 20X40
R722	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R724	0662057M50	0109038A80	RES. CHIP 100 5% 20X40

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Schematic Symbol	Component	Intermediate	Description
R725	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R731	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R745	0609591M49	0109038A80	RES CHIP DUAL 100K 5% .63W
R754	0662057N10	0109038A80	RES. CHIP 30K 5% 20X40
R755	0662057N39	0109038A80	RES CHIP 470K 5% 20X40
R765	0662057N09	0109038A80	RES. CHIP 27K 5% 20X40
R766	0662057N39	0109038A80	RES CHIP 470K 5% 20X40
R791	0662057N15	0109038A80	RES. CHIP 47K 5% 20X40
R800	0662057N33	0109038A80	RES. CHIP 270K 5% 20X40
R801	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R802	0662057N07	0109038A80	RES. CHIP 22K 5% 20X40
R803	0662057N05	0109038A80	RES. CHIP 18K 5% 20X40
R804	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R807	0662057M68	0109038A80	RES. CHIP 560 5% 20X40
R809	0662057M68	0109038A80	RES. CHIP 560 5% 20X40
R810	0662057N03	0109038A80	RES. CHIP 15K 5% 20X40
R811	0662057N21	0109038A80	RES. CHIP 82K 5% 20X40
R815	0662057M74	0109038A80	RES. CHIP 1000 5% 20X40
R817	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R818	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R819	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R901	0609591M33	0109038A80	RES CHIP DUAL 4.7K 5% 0.63W
R905	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
R911	0662057M90	0109038A80	RES. CHIP 4700 5% 20X40
R912	0662057N23	0109038A80	RES. CHIP 100K 5% 20X40
R913	0662057N27	0109038A80	RES. CHIP 150K 5% 20X40
R914	0662057N32	0109038A80	RES. CHIP 240K 5% 20X40
R915	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R980	0609591M45	0109040A42	RES CHIP DUAL 47K 5% 0.63W
R982	0662057M50	0109032A85	RES. CHIP 100 5% 20X40
R988	0662057M98	0109038A80	RES. CHIP 10K 5% 20X40
R990	0662057M78	0109032A86	RES. CHIP 1500 5% 20X40
R993	0662057N15	0109038A80	RES. CHIP 47K 5% 20X40
R994	0609591M45	0109038A80	RES CHIP DUAL 47K 5% 0.63W
R996	0662057M21	0109038A80	RES. CHIP 6.2 5% 20X40
R997	0609591M37	0109038A80	RES CHIP DUAL 10K 5% 0.63W
RT1	0611079B31	0109036A75	RES FIXED CHIP 220K 5 1/10 A/P
SH0001	2609827G03	0109036A75	SHIELD SPACER
SH0002	2609827G03	0109036A75	SHIELD SPACER
SH0005	2609480M01	0109040A42	SHIELD VCO/TIC ZAP
SH0006	2609480M01	0109040A42	SHIELD VCO/TIC ZAP
SH0007	2609480M01	0109040A42	SHIELD VCO/TIC ZAP
SH0008	2609478M01	0109040A42	SHIELD MIXER/ISO AMP ZAP
SH0009	2609479M01	0109040A42	SHIELD RF SWITCH ZAP
SH0011	2609482M01	0109040A42	SHIELD LOGIC 2 ZAP
SH0013	2609483M01	0109040A42	SHIELD LOGIC 3 ZAP
SH1	2609474M01	0109038A80	SHIELD LNA ZAP
SH12	2609481M03	0109038A80	SHIELD LOGIC 1 ZAP
SH14	2609484M01	0109038A80	SHIELD LOGIC 4 ZAP
SH2	2609475M01	0109038A80	SHIELD PA ZAP
SH3	2609827G10	0109036A75	SHIELD INDUCTOR SURFACE MNT
SH3	2609476M01	0109038A80	SHIELD GIF/SYN ZAP
SH4	2609827G10	0109036A75	SHIELD INDUCTOR SURFACE MNT
SH4	2609477M01	0109038A80	SHIELD EXCITER ZAP

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Schematic Symbol	Component	Intermediate	Description
U00101	5109920D12	0109040A42	IC DC-DC CONV INVDBLR 682EOA
U00340	5109632D91	0109040A42	IC CUST PAC SC79948DTB 14TSSOP
U00370	5109879E12	0109040A42	IC BICMOS TIC 6.1 14TSSOP
U00403	5109923D14	0109040A42	IC CUST RF PS INTRFC SDC5100T1
U00500	5199374C02	0109040A42	IC MASK DSP FIRESTORM 5013BT
U00701	5109841C42	0109040A42	IC MCU 68338 144BGA
U00702	5109509A16	0109040A42	IC SRAM 64KX16 KM616FS1000 BGA
U00704	5199342A01	0109040A42	IC FLASH ROM 512KX16 28F800B3
U00981	5109522E14	0109040A42	IC 2-INPUT OR GATE TC7S32FU
U220	5109632D92	0109038A80	IC CUST GIFSYN 5.2 F2KHAA9712
U301	4809527E31	0109038A80	TSTR NPN DUAL PHEMP 16TSSOP
U401	5109572E04	0109038A80	IC GAAS RF SW DPDT MS098
U703	5109962C11	0109038A80	IC ASIC BIC 4.2 SCS38138EC11
U705	5199301A01	0109038A80	IC EEPROM SPCL 8KX8 28BV64
U707	5199249A01	0109038A80	IC ROM LAZER D SSN DS2401P
U708	5109522E23	0109038A80	IC SNGL INV GATE TC7SH04FU
U709	5109522E30	0109038A80	IC BILAT SW QUAD TC74HC4066
U710	5109512F02	0109038A80	IC VOLT REG 2.7V LP2981 5SOT
U711	5109522E34	0109038A80	IC SNGL + GATE TC7SH08FU
U712	5109817F22	0109038A80	IC COMPTR LMC7221 SOT23
U900	5109923D38	0109038A80	IC CUST BICMOS GCAP LT 48QFP
U902	5109781E50	0109038A80	IC LIN 5V REG LM2970 SOT23
U980	5109152M07	0109040A42	IC EEPROM ANALOG ISD33180C2020
U982	5109731C03	0109038A80	IC OP AMP SSOP8 TA75W01FU
VR0354	4809877C04	0109040A42	DIODE VARACTOT SMV1104-36
VR0502	4809788E08	0109040A42	DIODE ZENER 8.2V UDZTE178.2B
VR0601	4813832P75	0109040A42	TRANS SUP QUAD 6.8 V
VR0802	4813830M74	0109040A42	DIODE DUAL 6.8V COM ANODE
VR1	4809788E11	0109036A75	DIODE ZENER 9.1V UDZ9.1B SOD
VR353	4809877C06	0109032A85	DIODE VARACTOR SMV1104-33
VR501	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
VR602	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
VR609	4813830M74	0109038A80	DIODE DUAL 6.8V COM ANODE
VR801	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
VR803	4809788E08	0109038A80	DIODE ZENER 8.2V UDZTE178.2B
Y701	4809995L05	0109038A80	XTAL QUARTZ 32.768KHZ CC4V-T1
Y702	4809612J19	0109038A80	XTAL 13MHZ 11PPM SMD 5X7 MM
	0109032A86	0102701T17	SMT PARTS XCVR BD DCS ZAP BACK
	0109038A80	0102701T17	SMT PARTS BACK FIRESTORM
	0109032A85	0102701T25	SMT PARTS XCVR BD DCS ZAP FRNT
	0109040A42	0102701T25	SMT PARTS XCVR ZAP FIRE FRNT
	4809788E08	0109036A75	DIODE ZENER 8.2V UDZTE178.2B
	0662057M01	0109038A80	RES. CHIP 0 5% 20X40
	1161	S8324A	PE - BEUTEL 130X250MM
	1309432U01	S8324A	ESC FLATZAP
	5402505T01	S8324A	LBL COMBI MOD/ZAP/STAC
	5602702Z06	S8324A	CTN REPL GSM XCVR MODULUS
	SUG1159F	S8324A	XCVR GSM/DCS CD930 EFR SW04.29
	8509397T01	SAG4013A	ANT STUBBY ZAP
	3209003J01	SHN6616A	GASKET ALERT 12MM
	5409158T10	SHN6616A	DECAL REAR BLK DOMES
	0309315B03	SHN6816A	SCR METRIC TYPE PT
	3209003J01	SHN6816A	GASKET ALERT 12MM
	5102543T01	SHN6816A	MIC PANASINIC = 5009536H15

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Schematic Symbol	Component	Intermediate	Description
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	5402373T01	SHN6816A	FCS LBL GSM MOD REAR HSG
	5402374T01	SHN6816A	FCS LBL GSM MOD REAR HSGTRVL
	6009223J03	SHN6816A	BATT COIN LITH BACKUP
	7509431U01	SHN6816A	GROMMET MIC FLATZAP
	3809429U01	SHN6817A	KEYPAD FLATZAP
	5409468U01	SHN6817A	LINER LENS
	6109428U07	SHN6817A	LENS FLAT ZAP THICK
	0102701T17	SRG4001F	ZAP DB FIRESTORM PARTS BACK
	0102701T25	SRG4001F	ZAP FIRESTORM P15 PARTS FRONT
	5402139T02	SRG4001F	ESN COMPOSITE LABEL SET
	5402287T01	SRG4001F	SMT IDENT LABEL
	CDLN4282B	SUG1159F	UNIQUE HSG KIT ZAP REAR BLK
	CDLN4290A	SUG1159F	UNIQU HSG KIT FLAT ZAP FRNT BLK
	SAG4013A	SUG1159F	ANTENNA GSM/DCS ZAP
	SHN6616A	SUG1159F	HSNG REAR ZAP
	SHN6816A	SUG1159F	H&H FLATZAP
	SHN6817A	SUG1159F	H&H FRNT FLATZAP
	SRG4001F	SUG1159F	XCVR CD920 EFR SW04.29
	SYN6973A	SUG1159F	KYBD FLAT ZAP NO TEMP COMPHOL
	0109036A75	SYN6973A	KYBD SMT PARTS FLAT ZAP NO TEM
	1102498T01	SYN6973A	TAPE DOUBLE SIDED
	1509433M01	SYN6973A	PLASTIC LIGHT GUIDE LCD
	3209455U02	SYN6973A	GASKET KEYBOARD
	4009422U02	SYN6973A	MYLAR POLY DOME 8 LED
	5402282T01	SYN6973A	KEYPAD FCS LABEL
	5402287T01	SYN6973A	SMT IDENT LABEL
	7209294M07	SYN6973A	LCD DSPL MOD 96X32PIX ZAP

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Product Description



GSM Zap and Zap C (Refresh)

Created By: Jim Filicette-WJF005 on 22.04.98 at 17:21
Category: Review

Version Number: 5

PR Number: A74-01 A74-02

Motorola Confidential Proprietary

1. Change Control and Release Approvals

Change Control:

Version Number	Date	Editor	Key Changes
1	4/22/98	Jim Filicette	Initial release of Zap refresh
2	5/25/98	Jim Filicette	<ul style="list-style-type: none"> •Revisions to MMI per Steve Akin's 5/22/98 email. •Add Tri-Codec and new vibrator •Clarify stage IV and V of Zap refresh
3	6/10/98	Jim Filicette	<ul style="list-style-type: none"> •Revise O2O feature •Add Stage I unicode support for phone book to stage V •Move VoiceNotes[™] improvement to stage IV •Add note to tri-codec (voice only HR)
4	7/1/98	Jim Filicette	Major Revisions: <ul style="list-style-type: none"> •Add Eastern European Languages •Clarify stages and features •Add paint requirements •Add manual, literature kit and model structure tables •Add unique SMS alert, last 10 improvements, quick access software features to list.
5	8/14/98	Jim Filicette	Major Revisions: <ul style="list-style-type: none"> •Update Table 1: chargers/Manuals •Update introduction and launch information •Update models to be replaced •Update software features •Update core models, content and variant tables •Update milestones •Add Table 2 to appendix •Add Table 3; literature kits

Release Approval Summary:

Version Number	Signed by	Date
Jim Filicette		
Tracey Koziol		
Ruchi Mangalik		
Steve Akin		
Neal Keating		
Doug Main		
Mike Hader		
Zaf Azam		
Philip Broderson		
Dave Loveridge		
Jim Barber		
Glenn Riese		

2. Introduction

2.1 Market Name & Launch Date

Market Name:

Europe: cd920 (flip); cd930 (flat)

Asia: cd928e (flip); cd938e (flat)

Ship Authorization date:

11/Sept/98 (use format DDMMYY)

2.2 Introduction Scope

This product description covers the worldwide requirements for GSM 900/1800 Zap and Zap C REFRESH. It will have two stages which will be called: Zap stage IV and Zap stage V. Zap refresh will have a number of long awaited software MMI improvements plus improved keypad and vibrator hardware features.

Zap stage IV ship authorization requirement of 11/SEPT/98 for Western European build and 01/OCT/98 for Eastern European build. Zap and Zap C will have simultaneous launch dates.

Zap stage V will include an enhanced version of stage IV plus Tri-Codec support (half rate). Zap stage V goal for ship acceptance is Dec/98.

Europe Plan:

Stage IV for Europe will have numerous MMI improvements and hardware improvements (key pad and vibraCall™). At the same time, painted housings on the flat version only will be available. The market name will remain the same. The market name for Zap refresh will remain the same as requested by the field.

Asia Plan:

Stage IV for Asia will require a product name change because of the numerous MMI improvements and hardware improvements (key pad and vibraCall™). The proposed market name for Asia is cd928e/cd938e. Stage V for Asia will not require a product name change because Half Rate support will be 'Soft' to the market (only operator). Asia plans to introduce manual band select to limited market on Aug 18, 1998 and full roll out on Sept 1, 1998.

2.3 Product Strategy

2.3.1 Signaling

Signaling Type:

GSM Dual Band

2.3.2 Key Selling Points

New key features in addition to previous versions for Zap Stage IV:

- Significant user interface enhancements
- Unicode for full SIM application toolkit class II plus stage I of Asian phone book
- Eastern European languages
- Improved keypad and VibraCall™

New key features in addition to the above for Zap Stage V:

- Tri-Codec support (voice only HR)

The following are key selling features of previous versions of Zap cd920/cd930:

- Dual-Band technology, the quality capacity solution
- Best in class radio, battery and speaker performance
- Ergonomically designed for comfortable handling
- Value added service delivery through SIM Toolkit
- 3 minute VoiceNote™ message recording feature
- Dual-Rate speech codec (FR and EFR)
- Ease of use
- Large, high contrast (Optimax™), easy to read display

2.3.3 Tier

Mid Tier

2.3.4 Channel

Same as cd920/cd930.

2.3.5 Competitors

Ericsson SH888; now shipping
 Nokia 6150, due end Q3-98
 Siemens S15; due end Q2-98
 Bosch Dual-Com 738; now shipping
 Mitsubishi MT-D30; due to launch in Q2-98
 NEC G10; due end Q3-98; and DB2000 also now due in Q3-98
 Nortel/AEG 2785; due in Q3-98

2.3.6 Key Target Customers

Same as cd920 and cd930.

2.3.7 Product Tiering Strategy

Zap is a product representing the mid tier.

2.3.8 Models to be Replaced

Model Name	Model Number	Comments
cd920	SE0007Bccxx	Stage II Flipped Zap
cd920	SE0012Bccxx	Stage II Flipped Zap w/ CPHS
cd920	SE0300Bccxx	Stage II Flipped Zap w/ SAT
cd920	SE0311Bccxx	Stage II Flipped Zap w/ CPHS & SAT
cd920	SE0287Bccxx	Stage II Flipped Zap w/ PHFA
cd920	SE0145Bccxx	Stage II Flipped Zap GSM 900 only
cd930	SE0006Bccxx	Stage III Flat Zap

cd930	SE0013Bccxx	Stage III Flat Zap w/ CPHS
cd930	SE0913Bccxx	Stage III Flat Zap w/ SAT
cd930	SE0310Bccxx	Stage III Flat Zap w/ SAT & CPHS
cd930	SE0288Bccxx	Stage III Flat Zap w/ PHFA
cd930	SE0146Bccxx	Stage III Flat Zap GSM 900 only

2.4 Target Markets

Zap is positioned as a feature loaded product, aimed at power users. In particular, the Business Accomplishment and Activity Management user segments will be targeted.

2.5 Advertising

To be developed in correlation to the Motorola Corporate Wings and brand awareness campaign. Advertising is to be consistent with cd920/cd930. Advertising for the refresh software and hardware features should be toned down. Advertising for the new Zap colors; Electric Blue and Shark Silver should be emphasised to demonstrate Motorola's capabilities in producing exciting colors and finishes. The promotion should be used to counter Nokia's work on the 6110 and 8810.

3. Product Description

3.1 Physical Characteristics

3.1.1 Phone

Zap refresh will not require any major modifications to the form factor. Flat Zap stage IV will include painted front, rear and battery door housings in electric blue and shark silver.

3.1.2 Housing

Same as cd920 and cd930.

3.1.3 Battery Door

Painted battery doors will be required to match the housing colors and be available

3.1.4 Display

Same as cd920 and cd930.

3.1.5 Lens

The shark silver phone will require a new lens to match the keypad. The color will be DM483 blue silver.

3.1.6 Keypad

Zap stage IV will include an improved keypad that will address the field complaints on

Zap. Also, shark silver will require a new keypad color to match the lens. The color will be DM483 blue/silver.

3.1.7 Escutcheon

A new escutcheon will be required for the shark silver phone. The color of the escutcheon will be shark silver with a semi gloss texture to blend in with the painted front housing.

3.1.8 Antenna

Same as cd920 and cd930.

3.1.9 Connectivity

Same as cd920 and cd930.

3.1.10 Sim Card

Same as cd920 and cd930.

3.1.11 Other Physical Characteristics

Define any other physical characteristics.

Zap stage IV will incorporate a new vibrator to improve the VibraCall™ feature. This will address complaints from the field on the quality of the vibrator. Zap should use the same vibrator that is being used in GSM 8700.

3.2 Performance Characteristics

3.2.1 Transceiver Performance

Volume (cubic cm)	Weight (grams)	Talk Time (minutes)	Standby Time (hours)	With Battery (Name)
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TALK/STANDBY TIMES - ZAP					
			DUAL BAND		
			TX/DRX2	DTX/DRX9	
TX	--->	ma	275	220	
RX	--->	ma	12.7	9.5	
Wgt	--->	grams	99		MKT
A. Nickel Metal Hydride					
TX	AAA - Long	650	2.4	3.0	2-3 hrs
RX	139cc	617.5	49	65	50-60 hrs
Wgt	Wgt	48	147		147 g
TX	AA	1100	4.0	5.0	4-5 hrs
RX	150cc	1045	84	110	80-100 hrs
Wgt	Wgt	83	182		193
B. Lithium Ion					
TX	P5	400	1.5	1.8	1-1.5 hrs
RX	139cc	380	30	40	30-40 hrs
Wgt	Wgt	20	119		119 g
TX	LP4 Saft	400	87	109	1-1.5 hrs
RX	139cc	380	30	40	30-40 hrs
Wgt	Wgt	23	122		122 g
TX	LSQ8	1000	3.6	4.5	3.5-4.5 hrs
RX	139cc	950	75	100	80-100 hrs
Wgt	Wgt	45	144		144 g
TX	Hi-Cap Pack	2800	10.2	12.7	10-12 hrs
RX	189cc	2660	209	280	200-250 hrs
Wgt	Wgt	124	223		
C. LiPolymer (Preliminary)					
TX	Lith Ploymer	480	105	131	
RX		456	36	48	
Wgt	Wgt	19	118		

Note: The above performance numbers are engineering estimates for Zap.

3.2.2 Compatible Battery Technology & Security

Same as cd920 and cd930. Zap refresh will also employ the invalid battery technology by utilizing the Dallas chip. Zap refresh will eliminate the invalid battery leaflet by integrating the information into the manual.

3.2.3 Charge Times

Battery	Charge time with E. P. Standard Travel Charger to 90 % charge (Minutes)	Charge time with E. P. Desktop Charger to 90 % charge (Minutes)
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Same as cd920 and cd930.

3.2.4 Data Compatibility

Same as cd920 and cd930.

3.3 Software and Hardware Requirements

Zap refresh will have the same feature set as Zap stage III launch plus the new features below.

Key Software Requirements:

Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority
Features required in Zap refresh stage IV:				
0203	Viag Home Zone	In process and committed		1
0195	SIM Toolkit class 2	In process and committed		1
0196	Eastern European languages (not including Hebrew)	In process and committed		1
?*	Asian subsidy lock enhancement	In process and committed		1
0016	Unicode for SIM Toolkit	In process and committed		1
0115	SMS Delete all messages option	In process and committed		1
0023	MO-SMS reply to MT-SMS	In process and committed		1
0014	SMS Phone book access	In process and committed		1
?*	Manual band select for dual band	In process and committed		1
0155	Increase SIM ADN locations from 155- 255	In process and committed		1
?*	Increase SIM SMS locations from 35 to 75	In process and committed		1
0162	Support for CSP based on CPHS V4.2	In process and committed		1
?*	Change CLI lookup to use 8 digits	In process and committed		1
n/a	Check card software	In process and committed	Note: No MMI required	1
?*	Conference call / call transfer improvement	In process and committed		1
?**	Unicode phone book support-stage 1	Under investigation, NOT committed	Note: This feature could hold up Zap refresh launch date in Asia	1
?*	Orange data field support	In process and committed		1
0138**	Quick access additions (3)	In process and committed		1

0075**	Last 10 call improvements	In process and NOT committed		2
0028**	Unique SMS alert tones	In process and NOT committed		2
?*	O2O dual band CSP bit	Under investigation, NOT committed		2

Features required in Zap refresh stage V:

0056**	Multi rate speech coder (FR/EFR/HR) (voice only HR)	In process and committed		1
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Note:

* = denotes marketing specification is not available

** = denotes marketing specification is available

Priority:

1 = Required, will not ship without

2 = Will be considered for future product launch; will ship without

Transceivers:

Zap refresh for Europe will allow upto 14 languages per transceiver. The languages will be formatted in the following:

The first Zap Refresh transceiver will have the following languages:	The second Zap Refresh transceiver will have the following languages:
English	English
French	Russian
German	Lithuanian
Turkish	Polish
Italian	Czech
Spanish	Slovakian
Danish	Croatian
Finnish	Romanian
Dutch	Slovenia
Greek	Latvian
Norwegian	Estonian
Portuguese	Ukraine
Swedish	Servian
Hungarian	Bulgarian

Key Hardware Requirements:

Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority
Z-1	Vibrator (same as 8700)	Stage IV	Committed	1
Z-2	Vibrator grommet	Stage IV	Committed	1
Z-3	Painted housings & batt doors (flat)	Stage IV	Committed	1
Z-4	Improved keypad	Stage IV	Committed	1
Z-5	Tricoder	Stage V		2
Z-6	New blue/silver lens	Stage IV	Committed	1
Z-7	New blue/silver keypad	Stage IV	Committed	1
Z-8	New shark silver escutcheon	Stage IV	Committed	1

Priority:

1=Must ship in stage IV launch on Sept 11

2=Must ship in stage V launch on Dec 1

3.4 Flex and Menu Requirements

3.4.1 Flex Default Requirements

Feature	Flex Default
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Same as cd920 and cd930

Same as cd920 and cd930.

3.4.2 Menu Requirements

Quick Access	New Features	New Features
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Phone Book	Call Related Features	Messages
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Phone Setup	Network Selection	Call Meters	Accessory Setup
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3.5 Packaging and Labeling

3.5.1 Box and Insert

New box artwork will not be required for Zap refresh.

Standard Box pack configuration.

Configuration	Contents	Quantity	Comments
Same as cd920/cd930 except the electric blue and shark silver models will substitute the leather holster for the plastic holster.			

Extended Box pack configuration.

Configuration	Contents	Quantity	Comments
Same as cd920/cd930.			

3.5.2 Artworks

No new artwork will be required for Zap refresh.

3.5.3 Labeling

Same as cd920/cd930.

EAN Numbers for each product type, for each market:

Market (Country)	Product Name	EAN Number	Comments
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3.6 Accessories and Compatibility

3.6.1 Current Accessories

Model, Kit, or Part Number	Accessory Name	Compatibility Notes
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Same as cd920 and cd930

3.6.2 Planned Accessories

Model, Kit, or Part Number	Accessory Name	Compatibility Notes	Availability Date
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Same as cd920 and cd930

3.7 Type Approval and Other Approvals

Same as cd920 and cd930

4. Models and Versions

4.1 New Sales Models - First Core Product

New Sales Models:

Sales Model Number	Brand	Description
SE0007Cccxx	cd920	Stage II Flipped Zap
SE0012Cccxx	cd920	Stage II Flipped Zap w/ CPHS
SE0300Cccxx	cd920	Stage II Flipped Zap w/ SAT
SE0311Cccxx	cd920	Stage II Flipped Zap w/ CPHS & SAT
SE0287Cccxx	cd920	Stage II Flipped Zap w/ PHFA
SE0145Cccxx	cd920	Stage II Flipped Zap GSM 900 only
SE0006Cccxx	cd930	Stage III Flat Zap
SE0013Cccxx	cd930	Stage III Flat Zap w/ CPHS
SE0913Cccxx	cd930	Stage III Flat Zap w/ SAT
SE0310Cccxx	cd930	Stage III Flat Zap w/ SAT & CPHS
SE0288Cccxx	cd930	Stage III Flat Zap w/ PHFA
SE0146Cccxx	cd930	Stage III Flat Zap GSM 900 only

cc = Color suffix, xx = language/market suffix

Note: For Europe, Zap refresh will utilize all the existing model numbers from the initial launch of Zap. Zap refresh will employ a similar up-suffixing scheme as stage I, II, III of Zap. Stage IV models will be up-suffixing to the 'C' version of Zap. Stage V model numbers will be up-suffixing to 'D' version of Zap model number.

New Field Service Models:

Field Service Model Number	Brand	Description
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4.2 New Sales Model Content - First Core Product

Models	Transceiver		Manual		Accessories		Other
cd920-flip							
Core Models	TCVR	Color	Language	Manual/Literature Kits	Accessories		Other
SE0007Cxxxx	SUG1264	Black	Western	Kit:	Battery (LSQ8): SNN5360		Holster (plastic):
SE0012Cxxxx	SUG1265	TP Blue	Western	See Table 1; Sect 4.4	Battery Door:		SHN6851
SE0300Cxxxx	SUG1266	MGX Grey	Western	P/N:	SHN6617-Black		Zap Wings Box:
SE0311Cxxxx	SUG1267	Black	Eastern	See Table 1; Sect 4.4	SHN6943-TP blue		560270Z14
SE0287Cxxxx	SUG1268	TP Blue	Eastern	Literature Kit:	SHN6825-MGX grey		Blue pulp insert:
SE0145Cxxxx	SUG1269	MGX Grey	Eastern	See Table 3; Appendix	Universal Charger: SPN4278		5603930K01
					Plug: See Table 1; Sect 4.4		Flip Esc: See Table 2; Appendix
cd930-flat							
Core Models	TCVR	Color	Language	Manual/Literature Kits	Accessories		Other
SE0006Cxxxx	SUG1259	Black	Western	Kit:	Battery (LSQ8): SNN5360		Holster (plastic):
SE0013Cxxxx	SUG1260	TP Blue	Western	See Table 1; Sect 4.4	Battery Door:		SHN6851
SE0913Cxxxx	SUG1261	MGX Grey	Western	P/N:	SHN6617-Black		*Holster (leather):
SE0310Cxxxx	SUG1262	Electric Blue	Western	See Table 1; Sect 4.4	SHN6943-TP blue		SYN6913
SE0288Cxxxx	SUG1263	Shark Silver	Western	Literature Kit:	SHN6825-MGX grey		Zap Wings Box:
SE0146Cxxxx	SUG1254	Black	Eastern	See Table 3; Appendix	SHN7105-Electric Blue		560270Z14
	SUG1255	TP Blue	Eastern		SHN7106-Shark Silver		Blue pulp insert:
	SUG1256	MGX Grey	Eastern		Universal Charger: SPN4278		5603930K01
	SUG1257	Electric Blue	Eastern		Plug: See Table 1; Sect 4.4		Flat Esc: See Table 2; Appendix
	SUG1258	Shark Silver	Eastern				

* Leather holster is to be structured with Electric blue and Shark Silver models.

4.3 New Sales Model Variants - Following Core Products

Model Number	Description	Unique item vs Core	Region Responsible for PD
SE0166CB1H2	Stage IV Flip Zap TIM-Italy	Escutcheon, Manual, Box, Flex	Europe
SE0160CB1H3	Stage IV Flip Zap Omnitel-Italy	Escutcheon, Flex	Europe
SE0167CB1H4	Stage IV Flip Zap Wind	Escutcheon, Flex	Europe
SE0161CH2B3	Stage IV Flip Zap Orange-UK	Escutcheon, Box, Flex	Europe
SE0162CB1B7	Stage IV Flip Zap O2O-UK	Escutcheon, Box, Manual, Flex	Europe
SE0164CB1G4	Stage IV Flip Zap Cosmote	Escutcheon, Flex	Europe
SE0282CB1F9	Stage IV Flip Zap Connect-Austria	Flex only	Europe
SE0165CB1F9	Stage IV Flip Zap Mobilix	Flex only	Europe
SE0151CB1F5	Stage IV Flat Zap Eplus - Germany	Escutcheon, Flex	Europe
SE0152CB1F8	Stage IV Flat Zap Viag - Germany	Escutcheon, Flex	Europe
SE0168CB1L2	Stage IV Flip Zap Movistar - Spain	Flex only	Europe
SE0169CB1L2	Stage IV Flip Zap AirTel - Spain	Flex only	Europe
SE0170CB1K2	Stage IV Flip Zap TMN - Portugal	Flex only	Europe
SE0147CB1K4	Stage IV Flat Zap Optimus - Portugal	Escutcheon, Flex	Europe
SE0172CB1E2	Stage IV Flip Zap Bouygues - France	Escutcheon, Flex	Europe

4.4 Manual Requirements

Models	Manual Kit Number	Manual Part Number	Language Market	Translation Priority
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Table 1. Chargers and Manuals						
Stage IV Flip ZAP	Stage IV Flat ZAP	Charger Plug	Manual Kit #	Manual P/N	Priority	Market or Language
SE0007CccA1 SE0012CccA1	SE0006CccA1 SE0013CccA1	SYN4655	SJN7598B	6809417A28	2	Danish
SE0007CccB1 SE0012CccB1	SE0006CccB1 SE0013CccB1	SYN6718	SJN7609B	6809417A29	Master	English (UK)
SE0007CccC1	SE0006CccC1	SYN4655	SJN7599B	6809417A30	2	Finnish
SE0007CccD1	SE0006CccD1	SYN4655	SJN7602B	6809417A31	2	Dutch
SE0007CccE1 SE0012CccE1	SE0006CccE1 SE0013CccE1	SYN4655	SJN7604B	6809417A32	2	French
SE0007CccF1	SE0006CccF1	SYN4655	SJN7608B	6809417A33	1	German
SE0007CccG1	SE0006CccG1	SYN4655	SJN7600B	6809417A34	3	Greek
SE0007CccH1	SE0006CccH1	SYN4655	SJN7607B	6809417A35	2	Italian
SE0007CccJ1	SE0006CccJ1	SYN4655	SJN7597B	6809417A36	2	Norwegian
SE0007CccK1	SE0006CccK1	SYN4655	SJN7601B	6809417A37	3	Portuguese
SE0007CccL1	SE0006CccL1	SYN4655	SJN7603B	6809417A38	3	Spanish
SE0007CccM1	SE0006CccM1	SYN4655	SJN7606B	6809417A39	2	Swedish
SE0007CccN1	SE0006CccN1	SYN4655	SJN7602B & SJN7604B	-	3	Belgium Package
SE0007CccP1	SE0006CccP1	SYN4655	SJN7604B SJN7607B SJN7608B	-	2	Swiss Package
SE0007CccQ1	SE0006CccQ1	SYN4655	SJN7595B	6809417A39	3	Turkish
SE0007CccR1	SE0006CccR1	SYN4655	SJN7596B	6809417A43	3	Hungarian
SE0007CccS1	SE0006CccS1	SYN4655	SJN7572B	6809417A44	4	Slovakian
other models	other models	SYN4655	SJN7610B	6809417A45	5	Arabic
SE0007CccT1	SE0006CccT1	n/a	SJN7604B SJN7610B	-	5	North Africa Package
SE0007CccU1	SE0006CccU1	SYN4655	SJN7593B	6809417A47	4	Russian
SE0007CccV1	SE0006CccV1	SYN4655	SJN7792B	6809417A48	4	Lithuanian
SE0007CccW1	SE0006CccW1	SYN4655	SJN7571B	6809417A49	4	Polish
SE0007CccY1	SE0006CccY1	SYN4655	SJN7793B	6809417A50	4	Czech
SE0007CccZ1	SE0006CccZ1	SYN4655	None	None		No language
SE0007CccB2	SE0006CccB2	SYN4655	SJN7609B	6809417A29	5	Engl S. Africa
SE0007CccC2	SE0006CccC2	SYN4655	SJN8173B	6809417A52	4	Croatian
SE0007CccF2	SE0006CccF2	SYN4655	SJN7608B	6809417A33	3	German - Austria
SE0007CccG2	SE0006CccG2	SYN6718	SJN7600B	6809417A34	5	Cyprus
SE0007CccP2	SE0006CccP2	SYN4655	SJN8174B	6809417A55	4	Romanian
SE0007CccS2	SE0006CccS2	SYN4655	SJN8175B	6809417A56	4	Slovenian
SE0007CccT2	SE0006CccT2	SYN6718	SJN7609B & SJN7610B	-	5	Gulf States Package
SE0007CccU2	SE0006CccU2	SYN4655	SJN8176B	6809417A57	4	Ukrainian
SE0007CccX2	SE0006CccX2	SYN4655	SJN8180B	6809417A58	5	Israeli
SE0007CccZ2	SE0006CccZ2	SYN6718	None	None		No language
SE0007CccA3	SE0006CccA3	SYN4655	SJN8177B	6809417A59	4	Latvian
SE0007CccC3	SE0006CccC3	SYN4655	SJN8178B	6809417A60	4	Estonian
SE0007CccA4	SE0006CccA4	SYN4655	SJN8179B	6809417A61	4	Bulgarian
SE0007Cccxx	SE0006Cccxx	SYNxxxx	SJN8530A	6809417A62	4	Serbian

5. Schedule Milestones

Schedule Milestone	Units	Requested Date (DDMMYY)	Comments
Non-Functioning Cosmetically Correct Units For Marketing Purposes	N/A		
Functioning Units For Marketing Purposes (final functionality not required)	20	24/AUG/98	Note: Painted units each color
Field Engineering Test Samples	30	31/AUG/98	Units with new keypad/vibrator
Worldwide Operator Test Samples	100	31/AUG/98	
Market Trial Test Samples	N/A		
Launch Requirements	30000	11/Sept/98	

6. Launch Volume

Required Introduction Date: 11/Sept/98
Launch Volume (number of units): 5.000

		Volume Region 1 EMEA	Volume Region 2 ASIA	Volume Region 3	Volume Other	Volume Total Worldwide
Period (MMYY)						
Required Stock for Launch	Sep. 98	15.000	15.000	0	0	30.000

Define expected Product Lifetime: Through Q4 1999

7. Future Product Requirements

Keep a list of all requirements requested in this product description, from the first draft through final copy, which ARE NOT POSSIBLE in this product design. The intent of this section is to keep a running list of all non-fulfilled requirements, for inclusion in the next product design activity.

Approval of this product description, brings an agreement between all team members, on what will be included in this product design. Items in this section are EXCLUDED from the approval.

Define Key Requirements Excluded From This Product Description, but required for

future product introduction.

Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority
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Define Other Expected Customers, in First 3 Months of Production:

Customer Name	Product Required	Comments
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8. Appendix

Attach any additional information required:

Table 2:

cd920 flip	Black	Magix Grey	Ten Pin Blue
Lens Surround	Black	Silver MM524	Black
Lens Printing	Pantone 427	Bright White	Pantone 427
Front Escutcheon Part Number	5409397M08	5409397M09	5409397M08
Front Escutcheon Background	Black	Silver MM524	Black
Front Escutcheon Finish	Glossy	Glossy	Glossy
Front Escutcheon Printing	Pantone 427	Bright White	Pantone 427
Back Escutcheon Part Number	5409158T04	5409158T04	5409158T04
Back Escutcheon Background	Black	Black	Black
Back Escutcheon Finish	Domed	Domed	Domed
Back Escutcheon Printing	Pantone 427	Pantone 427	Pantone 427
Keypad Background	Black	Black	Black
Keypad Finish	Hard	Hard	Hard

cd930 Flat	Black	Magix Grey	Ten Pin Blue	Electric Blue	Shark Silver
Lens Surround	Black	Silver MM524	Black	Black	Blue/Silver DM
Lens Printing	Pantone 427	Bright White	Pantone 427	Pantone 427	Pantone 427
Front Escutcheon Part Number	1309432U01	1309432U05	1309432U01	1309432U01	1309432U30
Front Escutcheon Background	Black	Silver MM524	Black	Black	Shark Silver
Front Escutcheon Finish	Glossy	Glossy	Glossy	Glossy	Textured
Front Escutcheon Printing	Pantone 427	Bright White	Pantone 427	Pantone 427	Black
Back Escutcheon Part Number	5409158T04	5409158T04	5409158T04	5409158T04	5409158T04
Back Escutcheon Background	Black	Black	Black	Black	Black
Back Escutcheon Finish	Domed	Domed	Domed	Domed	Domed
Back Escutcheon Printing	Pantone 427	Pantone 427	Pantone 427	Pantone 427	Pantone 427
Keypad Background	Black	Black	Black	Black	Blue/Silver DM
Keypad Finish	Silicon Matte	Silicon Matte	Silicon Matte	Silicon Matte	Silicon Matte

Table 3: Literature Kits				
Stage IV Flipped ZAP	Stage IV Flat ZAP	Kit Number	Market	Kit Contents
SE0007CccA1	SE0006CccA1	SJN8356BA	Denmark	Accessory leaflet-68p09414A66
SE0012CccA1	SE0013CccA1			
SE0007CccB1	SE0006CccB1	SJN8356BB	UK	Accessory leaflet-68p09414A67
SE0012CccB1	SE0013CccB1			Registration Card-68p09408A20
SE0007CccC1	SE0006CccC1	SJN8356BC	Finland	Accessory leaflet-68p09414A68
SE0007CccD1	SE0006CccD1	SJN8356BD	Netherlands	Accessory leaflet-68p09414A69
				Registration Card-68p09408A24
SE0007CccE1	SE0006CccE1	SJN8356BE	France	Accessory leaflet-68p09414A70
SE0012CccE1	SE0013CccE1			Registration Card-68p09408A21
SE0007CccF1	SE0006CccF1	SJN8356BF	Germany	Accessory leaflet-68p09414A71
				Registration Card-68p09408A22
				24 hour service-68p09405A07
SE0007CccG1	SE0006CccG1	SJN8356BG	Greece	Accessory leaflet-68p09414A72
SE0007CccH1	SE0006CccH1	SJN8356BH	Italy	Accessory leaflet-68p09414A73
SE0007CccJ1	SE0006CccJ1	SJN8356BJ	Norway	Accessory leaflet-68p09414A74
SE0007CccK1	SE0006CccK1	SJN8356BK	Portugal	Accessory leaflet-68p09414A75
				Waranty Card-68p09405A09
SE0007CccL1	SE0006CccL1	SJN8356BL	Spain	Accessory leaflet-68p09414A76
				Registration Card-68p09408A23
				Waranty Card-68p09405A08
SE0007CccM1	SE0006CccM1	SJN8356BM	Sweden	Accessory leaflet-68p09414A77
SE0007CccN1	SE0006CccN1	SJN8356BN	Belgium	Accessory leaflet-68p09414A78
SE0007CccP1	SE0006CccP1	SJN8356BP	Switzerland	Accessory leaflet-68p09414A79
SE0007CccQ1	SE0006CccQ1	SJN8356BQ	Turkey	Accessory leaflet-68p09414A80
SE0007CccR1	SE0006CccR1	SJN8356BR	Hungary	Accessory leaflet-68p09414A81
SE0007CccS1	SE0006CccS1	SJN8356BS	Slovakia	Accessory leaflet-68p09414A82
other models	other models	SJN8356BT	Arab/Eng/French	Accessory leaflet-68p09414A83
SE0007CccT1	SE0006CccT1	SJN8356BT	North Africa	Accessory leaflet-68p09414A83
SE0007CccU1	SE0006CccU1	SJN8356BU	Russia	Accessory leaflet-68p09414A84
SE0007CccV1	SE0006CccV1	SJN8356BV	Lithuania	Accessory leaflet-68p09414A85
SE0007CccW	SE0006CccW1	SJN8356B	Poland	Accessory leaflet-68p09414A86
SE0007CccY1	SE0006CccY1	SJN8356BX	Czech Republic	Accessory leaflet-68p09414A87
SE0007CccZ1	SE0006CccZ1	NONE	Generic UK plug	None
SE0007CccB2	SE0006CccB2	SJN8491BA	So Africa	Accessory leaflet-68p09414A67
SE0007CccC2	SE0006CccC2	SJN8356BY	Croatia	Accessory leaflet-68p09414A88
SE0007CccF2	SE0006CccF2	SJN8489BA	Austria	Accessory leaflet-68p09414A71
				Registration Card-68p09408A22
				24 hour service-68p09405A16
SE0007CccG2	SE0006CccG2	SJN8356BZ	Cyprus	Accessory leaflet-68p09414A89
SE0007CccP2	SE0006CccP2	SJN8490BA	Romania	Accessory leaflet-68p09414A90
SE0007CccS2	SE0006CccS2	SJN8492BA	Slovenia	Accessory leaflet-68p09414A79
SE0007CccT2	SE0006CccT2	SJN8493BA	Gulf States	Accessory leaflet-68p09414A83
SE0007CccU2	SE0006CccU2	SJN8357BA	Ukraine	Accessory leaflet-68p09414A91
SE0007CccX2	SE0006CccX2	SJN8357BB	Israel	Accessory leaflet-68p09414A92
SE0007CccZ2	SE0006CccZ2	NONE	Generic UK plug	None
SE0007CccA3	SE0006CccA3	SJN8357BC	Latvia	Accessory leaflet-68p09414A93
SE0007CccC3	SE0006CccC3	SJN8357BD	Estonia	Accessory leaflet-68p09414A94
SE0007CccA4	SE0006CccA4	SJN8357BE	Bulgaria	Accessory leaflet-68p09414A95
SE0007Cccxx	SE0006Cccxx		Serbia	



Zap Refresh Aug 98.pj

Core Product Description

ZAP

GSM900/1800 Stages I, II and III

Project Nos.

Flipped ZAP

A74-01

Flipless ZAP

A74-02

Issue 8.0

Note: This document is also available on Lotus Notes at the following location:

- EMEA Product Description
- - ZAP version 8.0
- - - Section 8. Appendix
- - - - ZAP PD v8.0.doc (An MS Word Attachment)

Dominic Strowbridge

October 12, 1998

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October 12, 1998

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REVISION HISTORY

<u>Version</u>	<u>Date</u>	<u>Name</u>	<u>Reason</u>
Issue 1.2	24 Jul 97	Pete Thompson	Latest release of 'Flip' ZAP Product Description.
Issue 1.0	28 Jul 97	Pete Thompson	Initial release of 'Flat' ZAP Product Description.
Issue 2.0	05 Sept 97	Dominic Strowbridge	First release of combined Flipped and Flipless ZAP Product Description, for limited distribution only.
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Issue 4.0	10 Dec 97	Dominic Strowbridge	Third main release: main changes documented in previous versions.
Issue 5.0	22 Jan 98	Dominic Strowbridge	Fourth main release: main changes documented in previous versions.
Issue 6.0	12 Mar 98	Dominic Strowbridge	Fifth main release: main changes documented in previous versions.
Issue 6.1	19 Mar 98	Dominic Strowbridge	Change Magix Grey to 'H2' suffix; update Appendix 3. Delete 20k flipless forecast for May.
Issue 7.0	15 May 98	Dominic Strowbridge	Main changes include: <ul style="list-style-type: none"> • Definition of Stage I in Europe to SIM Application Toolkit • Definition of Stage II in Europe to include non-EFR • Update competitive information • Include possibility of using 'Optimax' trademark • Move refresh ZAP details to the introduction only • Add painted Flipless ZAP housings to the requirements • Correct keypad finish • Correct introduction timescale for Retractable Antenna • Change battery names and correct volumes/capacities/weights • Move Financial section to separate document and update • Add details of flexing scheme for Non-EFR models • Add model numbers for European Operator models • Add transceiver and box part numbers to model structures • Change UK plug to new version that passes BSI • Remove French manual from Gulf States package • Add Service Transceiver model numbers • Add matrix of Service Kit numbers for each package • Add EANs for main packages • Correct Type Approval date • Correct Accessory Part Numbers
Issue 8.0	24 June 98	Dominic Strowbridge	Main changes include: <ul style="list-style-type: none"> • revision to ZAP Refresh plan • update on key competitors • confirm use of 'Optimax™' for holographic display • add dimensions for each battery configuration • simplify 'A' and 'B' suffix convention to cover all models • add core model numbers with PHFA • add Connect Austria; remove Telecel, FT and SFR • change standard battery from SNN5090 to SNN5360 • add different colour transceivers and battery doors • add English, French & Arabic manuals to MidEast packages • add Invalid Battery leaflets to Service Packs • add TAC, FAC and Serial number information

October 12, 1998

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-
- update accessory table; add POS package part numbers

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1. INTRODUCTION

This product description covers the worldwide requirements for the GSM900/1800 ZAP family of products, including performance and features. However, only the core Motorola models for European markets are described in detail. Operator specific models required for European channels and models for the Asian markets will be described in separate 'variant' product descriptions issued by the appropriate groups.

A minor update of the ZAP product will be required in August 1998, to support the VIAG Home Zone feature for a new operator in Germany. This update will not require worldwide field testing. A separate product description will be issued for this product.

A ZAP Refresh product has been defined for launch in September '98 (Stages IV and V), when the following key changes will be added:

- MMI Enhancements to SMS
- SIM Application Toolkit upgraded to full Class II
- Tri-Rate Codec (Full Rate, EFR and Half Rate)

A separate product description has been issued for the refreshed product.

A further refresh of the product may be made in Q1-99, to include the Whitecap chipset; adding features such as internal data and enhanced performance.

The following programmes make use of ZAP family plastics and technology, and therefore must be included when considering the positioning of the ZAP products:

- N-AMPS ZAPPER
- CDMA ZAP

1.1 Product Strategy

The ZAP products will replace the 8000 series and Slimlite products, in the mid tier of the market. Product introduction is due in Q2-98, and will take place in three main stages:

ZAP Launch Stages	EUROPE	ASIA
Stage I: No EFR, black flipped variant only	Test markets in South Africa and Switzerland Limited launch in Nordic markets for June only	Test market in Hong Kong; Launch with Asian SMS and Chinese languages in Asian markets
Stage II: Fully featured flipped variant	Full launch in Europe	Will NOT ship in Asia
Stage III: Fully featured flipless variant	Full launch in Europe	Full launch in Asia with Asian SMS and Chinese languages

The decision to launch a non-EFR Stage I product in some European markets has been taken due to the continued slip of the full Stage II product. However, no distinction will be

made in the market between the non-EFR and EFR versions; only the model number will be upsuffixed to mark this change. It is envisaged that the non-EFR version will only ship for approximately one month before the EFR version is freely available.

Key competitors are listed below. See Appendix A5 for more details.

- Ericsson sh888, now shipping
- Nokia 6150, due end Q3-98
- Siemens S15, due end Q2-98
- Bosch Dual-Com 738, now shipping
- Mitsubishi MT-D30, due to launch in Q2-98
- NEC G10, due end Q3-98; and DB2000 also now due in Q3-98
- Nortel/AEG 2785, due in Q3-98

As more manufacturers move over to dual-band designs, single-band products will become less significant as competitors.

ZAP will be differentiated from the key competitors by the following key advantages:

- Ergonomically designed for comfortable handling
- Large, Optimax™ high contrast display
- VibraCall™ vibrating alert as standard
- 3 minute VoiceNote™ message recording feature
- Dual-Band technology; the quality capacity solution

1.2 Target Markets

ZAP will be positioned as a feature loaded product, aimed at power users. In particular, the Focused and Balanced Business user segments will be targeted.

1.3 Distribution Strategy

The ZAP product family gives Motorola the possibility of regaining market share in the mid tier. Both flipped and flat variants of the product will be available, in 3 different coloured plastics. The distribution strategy will be evolved over the next few months to take advantage of all the opportunities this variety can support. As deals are negotiated with the channels, any issues concerning exclusivity in a market will be noted here.

No single band variant of ZAP will be offered, in order to reinforce the Dual-Band 'Quality Capacity Solution' message.

2. PRODUCT DESCRIPTION

2.1 Physical Characteristics

2.1.1 Size Goals

The size goal for ZAP is 139cc in the standard configuration. Dimension goals for the standard configuration are 130 x 55 x 27 mm.

2.1.2 Housing

ZAP will utilise a completely new front and back housing. Based on survey data and field feedback, the housing is rounded and emphasises simplicity. Two designs will be used: the first design to launch will incorporate a flip; the second will be flipless. The flipless version will differ slightly besides the flip, including a rounded lens. The flipless version will be launched no later than 12 weeks after the flipped version.

- **Main housings:**

The main housings will incorporate three buttons on the left side, functioning as up and down volume, plus a smart key (similar to StarTAC™). On the right side, a dedicated voice memo record button will be located. The ear piece should give maximum benefit to the dynamic speaker, and the asymmetry of the microphone should be disguised with styling marks. A ridge should be incorporated around the power button, to prevent accidental operation. If blind user location markers can not be incorporated into the keypad design, they should be included around the '5' key.

The rear housing will be cut away at the bottom to utilise a battery door concept. An alert port will be located near the top of the back housing.

- **Battery door:**

Three doors will be required: a slim door will house the Weight Leadership, AAA Long and LGQ8 batteries; a slightly larger door will cover the AA batteries; and the largest door will house the Performance Leadership battery. The doors will be completely removeable and have the same colour and texture as the main housings.

- **Escutcheons:**

3 different escutcheons will be required for the ZAP family: all designs will take a rear escutcheon, designed to give more exposure to the Motorola Brand and also to cover two assembly screws on the back housing; the flipped variant will take an escutcheon on the flip; and the flipless variant will take an escutcheon at the base of the front face. The back escutcheon will be fitted in the Factory; front escutcheons will be assembled in Distribution. See Appendix A2 for details of escutcheon colours.

- **Colours:**

ZAP products will be available in three different colours from Stages II and III. These are: Black; Magix Grey; and Ten Pin Blue. The following parts will be changed according to colour: the front and back housings; the battery door; escutcheons and lens. Keypads will not vary. No other parts will be affected.

Special editions of the Flipless ZAP will be created using painting techniques (for

example, the metallic blue used at CeBIT). A range of specials are required for August 1998. Keypad, Lens and Escutcheons may be changed to compliment these new colours.

- **Texture:**

Front, back and battery door will be finished with a textured surface that feels 'silky' to the touch. The finish will be VDI27. This should de-emphasise the appearance of smudges and facial oil.

2.1.3 Display

The display will consist of a 96 x 32 pixel LCD module, with full graphics support and icons. Utilising the same pixel density of both StarTAC™ and 8700, the display size will be slightly smaller, measuring 34 x 23 mm. The display icons will be arranged in two rows, located at the top of the display, to allow the integration of soft prompts at the bottom of the display when WAP is introduced.

Top Row: Signal strength indicator, Real-time clock, Battery charge indicator

Bottom Row: Off-hook, Roam, Home Zone, Voicemail, SMS, Ringer On

Note: 'Ringer On' is a new feature, not offered in previous products.

2.1.4 Lens

The different lenses for Flipped and Flipless ZAP will be curved to follow the contours of their front housings. Motorola branding will be positioned at the top of the lenses in stark white. The lenses will have glossy finishes, and be the same colours as the main housings. However, the finish should minimise glare. The borders around the displays must be minimised, but should not allow any gasket material to show through. A Holographic effect will be applied to the lenses of the models in Stages II and III of the product launch.

2.1.5 Keypad

The flipped ZAP keypad will consist of 18 keys; the flipless ZAP keypad will consist of 17 keys, as the scroll up and down keys will be incorporated into one rocker key. The flipped ZAP keypad will have hard keys; the flipless ZAP keypad will be made of rubber with a clear encapsulated, non-glare top (this will blend with the larger lens area of the flipless design). See below for keypad layout.

Cancel	Scroll up Menu	Scroll down Menu	OK
1	2 ABC	3 DEF	
4 GHI	5 JKL	6 MNO	
7 PQRS	8 TUV	9 WXYZ	
Scroll left *	0 +	# Scroll right	
Power		Quick Access	

Spacing of keys must be maximised, as per form factor survey results. Tactile response should also be maximised. Key colours will be:

- Background: Black for all keys (Pantone 6C)
- Digits, alphas, Menu, Quick Access, scroll icons: White (Pantone 427C)
- Cancel and power icon: Red (Pantone 485C)
- OK: Green (Pantone 347C)

Side buttons will all be black in colour.

2.1.6 LED Indicators

A status LED indicator will be positioned at the top left of the phone, towards the front. This indicator will have the same functionality as on the StarTAC™.

2.1.7 Connectors

ZAP will use the same connector for battery charging, RF output and connection to peripherals as on the StarTAC™.

2.1.8 SIM Card

ZAP will utilise a small SIM card size. The SIM will be positioned in the back housing, under the battery. A sliding, flip-up door configuration will be used to allow for easy insertion and removal.

2.1.9 Antenna

The antenna will support both 900 and 1800 mHz frequencies. ZAP will ship with a fixed, black antenna. As soon after launch as possible, a retractable antenna accessory will be developed; from that point, all new units will be capable of being retro-fitted with the retractable antenna.

2.2 Performance Characteristics

2.2.1 Radio Performance

The following targets should be met for free space radio performance of the ZAP platform:

Retractable antenna up:	better than 8700 antenna up
Retractable antenna down:	better than 8700 antenna down
Fixed antenna:	better than 8700 antenna up

2.2.2 Battery Performance

Below are estimates for talk and standby times for the ZAP platform. These figures must be verified by Engineering before promotional material is published.

Priority for battery production is:

1. LGQ8 for Stage I launch
2. AAA Long for Stages II and III, with 500 units of other types also available
3. All other batteries available within 3 months of Stage II and III launches

Volume (cc)	Weight (gr)	Dimensions (mm)	Talk Time* (mins)	Standby Time* (hours)	with Battery
139	98	-	-	-	Transceiver only
139	120	130 x 55 x 27	60 - 90	30 - 40	Weight Leadership Li Ion (400 mAh)
139	147	130 x 55 x 27	150 - 180	60 - 80	AAA Long NiMH (650 mAh)
139	145	130 x 55 x 27	210 - 270	90 - 105	LGQ8 Li Ion (1000 mAh)
160	185	130 x 55 x 32	210 - 270	90 - 120	AA NiMH (1100 mAh)
189	230	130 x 55 x 43	480 - 600	200 - 250	Performance Leadership Li Ion (2800 mAh)
160	N/A**	130 x 55 x 32	N/A**	N/A**	2 x AA Alkaline

* All battery performance times are approximate and will vary depending on network configuration, band and status, and the functions selected. Times are quoted as a range from DRX=2 to DRX=9. Support of DTX mode is dependent on network support and may not be available in all areas.

** Because of the wide variation of talk and standby times with different alkaline batteries, these will be promoted for 'emergency use only'.

2.2.3 Battery Charge Times

Maximum acceptable charge times are shown below.

Battery	Charge time with E.P. Standard Travel Charger to 90% charge	Charge time with E.P. Desktop Charger to 90% charge
Weight Leadership Li Ion (400 mAh)	120 minutes	120 minutes
AAA Long NiMH (650 mAh)	60 minutes	60 minutes
LGQ8 Li Ion (1000 mAh)	180 minutes	180 minutes
AA NiMH (1100 mAh)	90 minutes	90 minutes
Performance Leadership Li Ion (2800 mAh)	240 minutes	240 minutes

2.2.4 Compatible Battery Technology

ZAP will be the first product on a 3.6 volt platform to use label-wrapped batteries. Battery security will only allow Motorola batteries to be charged.

2.2.5 Data Compatibility

The Band-Aware will support 9600 baud data and fax rates in conjunction with a compatible PC card (eg CELlect 1+, 2 or 3) or the Smart CELlect™ data cable.

3. TIMING, DEMAND AND FINANCIAL TARGETS

3.1 Introduction

The Stage I Flipped ZAP product was ship accepted on 12th June 1998. In Europe, this variant was shipped to South Africa and Switzerland for initial trials and fully launched in a limited number of markets. In Asia, the Asian languages and Asian SMS will be added and the product shipped until Stage III is available. This initial product will only be available in Black.

The Stage II fully featured Flipped ZAP product will be shown at CeBIT during March and ship accepted at the end of June. This will be available in all three colours.

The Stage III Flipless ZAP product will be ship accepted within 8 weeks of Stage II. However, it will be available in all three colours for presentation at CeBIT.

See separate Business Case Product Description for Forecasts and Financial Targets.

3.2 Expected Lifetime

The ZAP platform is expected to ship into the market until the end of Q2-99. Refreshed versions of the product may be introduced through the product lifecycle.

4. SOFTWARE AND MMI DESCRIPTION

ZAP will use the Personality™ II interface. It will take the complete feature set of the International 8900 (after the first maintenance release of software, which includes IP-Phonebook and Call Transfer), plus the features listed below. Note definitions of feature priorities below:

- 1 Features that are not negotiable; they are essential parts of the proposition for this new product. The launch will be delayed until these features are ready.
- 2 Important usability or operator requested features. Significant sales volumes will be lost if these features are not included.
- 3 Other features requested by the field.

Tracking Number	Description	Status for Stage I launch	Status for Stages II & III	Priority
n/a	Combined Menu and Scroll keys	Committed		1
n/a	LED status indicator flex control	Committed		1
0198	Headset answer on/off support	Committed		1
0165	Stop Call Alert with Volume keys	Committed		1
0131	Delayed Power On and Off flex control	Committed		1
n/a	Smart Connect		Committed	1
n/a	Ability to flex as single-band GSM900 or GSM1800	Committed		1
0112	Ringer-On display icon	Committed		1
n/a	Real Time Clock and Date	Committed		1
0198	Smart Key (place/answer calls with Smart Key)	Committed		1
n/a	Invalid battery feature	Committed		1
0165	Alert Muting feature	Committed		1
0067	Voice Note support	Committed		1
n/a	Asian SMS	Committed (Asia only)		1
n/a	Support for SmartCELlect cable modem		Committed	1
0057	EFR / FR Codec support		Committed	1
0039	SIM Tool Kit 1+		Committed	1
0157	6 x SIM interface		Committed	1

Tracking Number	Description	Status for Stage I launch	Status for Stages II & III	Priority
0158	SIM Lock modifications	Committed		2
0021	Service Dialling Numbers	Committed		2
0185	16k SIM		Not Committed	2
0187	Delayed Answer		Not Committed	2
0022	CPHS version 3.2		Not Committed	2
0174	Keypad Lock prevents power off		Not Committed	2
0115	'Delete All Messages' menu and Quick Access item		Not Committed	2
0135	'Show Date' Quick Access item		Not Committed	2
0190	'Credit Remaining' Quick Access item or key		Not Committed	2
0167	SIM Copy (GCSA implementation)		Not Committed	2
0038	Closed User Group (CUG)		Not Committed	2
0023	SMS-MO Reply to SMS-MT		Not Committed	2
0128	Local Languages - Extended Latin		Not Committed	2
0196	Local Languages - Cyrillic		Not Committed	2

Tracking Number	Description	Status for Stage I launch	Status for Stages II & III	Priority
0139	Unique Ringer Tone	Committed		3
0143	SMS Status Report		Not Committed	3
0053	Multipage SMS		Not Committed	3
0014	Phonebook access for Call Divert and SMS		Not Committed	3
0051	Interchangeable language sets - Latin		Not Committed	3
0197	Interchangeable language sets - Cyrillic		Not Committed	3
0020	Quick Access Location Finder		Not Committed	3
0075	Distinguish answered & missed last calls		Not Committed	3
0155	Additional SIM AND locations (over 155 limit)		Not Committed	3
n/a	'Find New Network' Quick Access item		Not Committed	3
0015	Alarms / Scheduler		Not Committed	3
0072	Teleservice 89: Multiple Line Service for GSM		Not Committed	3

Software builds for the Asian and European models will initially be separate. However, the aim is to combine the core feature set builds, with Asian specific features being added afterwards. When this integration is achieved the only differences between the two feature sets will be as follows:

	European Models	Asian Models
Languages	Full European Language set	Full European Language set PLUS Simplified Chinese Complex Chinese Thai Vietnamese with tonal marks Bahasa - Indonesian
Additional Features	- none -	All Asian SMS Chinese Date Format Chinese PLMN and Incountry PLMN Roaming Support for two bitmaps: 15x15 and 15x16

Flexing

Note that to cope with the release of both non-EFR and EFR versions of the product in Europe the following conventions will be used. 'A' suffix flexes will support non-EFR models ONLY. eg

- SE0006A???? - Motorola Flipless ZAP - Non-EFR
- SE0007A???? - Motorola Flipped ZAP - Non-EFR
- SE0012A???? - Motorola Flipped ZAP - Non-EFR, w/CPHS
- SE0013A???? - Motorola Flipless ZAP - Non-EFR, w/CPHS

'B' suffix flexes will support EFR models ONLY. eg

- SE0006B???? - Motorola Flipless ZAP - EFR
- SE0007B???? - Motorola Flipped ZAP - EFR
- SE0012B???? - Motorola Flipped ZAP - EFR, w/CPHS

- SE0013B???? - Motorola Flipless ZAP - EFR, w/CPHS

5. MODELS/VERSIONS

5.1 New Core Sales Models

Model Number	Brand	Description
SE0005AB1xx	Motorola	STAGE I FLIPPED ZAP FOR TEST MKTS
SE0007AB1xx	Motorola	STAGE I FLIPPED ZAP
SE0012AB1xx	Motorola	STAGE I FLIPPED ZAP W/CPHS
SE0007Bccxx	Motorola	STAGE II FLIPPED ZAP
SE0012Bccxx	Motorola	STAGE II FLIPPED ZAP W/CPHS
SE0006Bccxx	Motorola	STAGE III FLIPLESS ZAP
SE0013Bccxx	Motorola	STAGE III FLIPLESS ZAP W/CPHS

Note: xx = language; cc = colour (B1 is Black; X1 is Ten Pin Blue; H2 is Magix Grey)

5.2 Other New Sales Models

The models listed below are described in separate variant product descriptions.

Model Number	Region Responsible for PD	Short Description	Unique Items vs Core
S7940ABW	Asia	Stage I ZAP for China	Transceiver Escutcheon Manual Flex
S7941ABX	Asia	Stage I ZAP for Taiwan	Transceiver Escutcheon Manual Flex
S7942ABX	Asia	Stage I ZAP for Hong Kong / Macau	Transceiver Escutcheon Manual Flex
S7943ABB	Asia	Stage I ZAP for S. Asia (Euro Plug)	Transceiver Escutcheon Manual Flex

S7944ABB	Asia	Stage I ZAP for S. Asia (Xcvr only)	Transceiver Escutcheon Manual Flex
S7945ABB	Asia	Stage I ZAP for S. Asia (US Plug)	Transceiver Escutcheon Manual Flex
S7946ABB	Asia	Stage I ZAP for Australia/NZ	Transceiver Escutcheon Flex
S7979ABB	Asia	Stage I ZAP for S. Asia (Delux Euro)	Transceiver Escutcheon Flex
S7980ABB	Asia	Stage I ZAP for S. Asia (Delux US)	Transceiver Escutcheon Flex
S7981ABZ	Asia	Stage I ZAP w/ S. Asia Languages	Transceiver Escutcheon Flex
SE0287vccxxx	Europe	Stage I (v=A) or Stage II (v=B) ZAP with PHFA	Add PHFA to std package
SE0288Bccxxx	Europe	Stage III ZAP with PHFA	Add PHFA to std package
SE0166BB1H2	Europe	Stage II ZAP for TIM	Escutcheon Manual Box, Flex
SE0160BB1H3	Europe	Stage II ZAP for Omnitel	Escutcheon Flex
SE0167BB1H4	Europe	Stage II ZAP for Wind	Escutcheon Flex
SE0161BH2B3	Europe	Stage II ZAP for Orange	Escutcheon Box, Flex
SE0162BB1B7	Europe	Stage II ZAP for One2One	Escutcheon Box, Manual Flex
SE0164BB1G4	Europe	Stage II ZAP for Cosmote	Escutcheon Flex
SE0282AB1F9	Europe	Stage I ZAP for Connect	Flex only
SE0165AB1A5	Europe	Stage I ZAP for Mobilix	Flex only

SE0151BB1F5	Europe	Stage III ZAP for E-Plus	Escutcheon Flex
SE0152BB1F8	Europe	Stage III ZAP for Viag Interkom	Escutcheon Flex
SE0168BB1L2	Europe	Stage II ZAP for Movistar	Flex only
SE0169BB1L3	Europe	Stage II ZAP for AirTel	Flex only
SE0170BB1K2	Europe	Stage II ZAP for TMN	Flex only
SE0147BB1K4	Europe	Stage III ZAP for Optimus	Escutcheon Flex
SE0172BB1E2	Europe	Stage II ZAP for Bouygues	Escutcheon Flex

5.3 New Sales Model Structures

Model	Transceiver	Manual	Accessories	Other
Stage I Flipped ZAP SE0005AB1xx and SE0007AB1xx and SE0012AB1xx	Kit: SUG1137 Rear escutcheon: See Appendix 3	Kit: See below Manual: See Table 1 below Literature Kit: See Table 2 below	Battery (LGQ8): SNN5360 Battery Door (AAA): SHN6617 - Black Universal Charger: SPN4278 Plug: See Table 1 below	Holster (Plastic): SHN6851 Generic Art Box: 5603929K01 Blue Pulp insert: 5603930K01 Flip Escutcheon: See Appendix 2
Stage II Flipped ZAP SE0007Bccxx and SE0012Bccxx	Kit: SUG1165 - Black or SUG1162 - Grey or SUG1192 - Blue Rear escutcheon: See Appendix 3	Kit: See below Manual: See Table 1 below Literature Kit: See Table 2 below	Battery (LGQ8): SNN5360 Battery Door (AAA): SHN6617 - Black or SHN6825 - Grey or SHN6943 - Blue Universal Charger: SPN4278 Plug: See Table 1 below	Holster (Plastic): SHN6851 ZAP WINGS Box: 5602702Z14 Blue Pulp insert: 5603930K01 Flip Escutcheon: See Appendix 2
Stage III Flipless ZAP SE0006Bccxx and SE0013Bccxx	Kit: SUG1159 - Black or SUG1173 - Grey or SUG1172 - Blue Rear escutcheon: See Appendix 3	Kit: See below Manual: See Table 1 below Literature Kit: See Table 2 below	Battery (LGQ8): SNN5360 Battery Door (AAA): SHN6617 - Black or SHN6825 - Grey or SHN6943 - Blue Universal Charger: SPN4278 Plug: See Table 1 below	Holster (Plastic): SHN6851 ZAP WINGS Box: 5602702Z14 Blue Pulp insert: 5603930K01 Front Escutcheon: See Appendix 2

Note: SE0012 differs to SE0007 only by the flex; as does SE0013 to SE0006.

5.4 European Model, Charger Plug and Manual Requirements

Manuals will be single colour, single language, A6, POD configuration. Table 1. below shows all relevant part numbers. A separate 'Literature Kit' will be structured to take additional leaflets, an Accessories Brochure, Sales Promotions and special Warranty cards. Table 2. shows all relevant part numbers. Where no items are listed in the Literature Kit, the pack does not need to be included; if Accessory leaflets are not available at time of launch, product may still ship.

Table 1. Chargers and Manuals			Charger Plug	Manual		Priority	Market or Language
Stage I Flipped ZAP	Stage II Flipped ZAP	Stage III Flipless ZAP		Kit Number	Part Number		
SE0007AB1A1	SE0007BccA1 SE0012BccA1	SE0006BccA1 SE0013BccA1	SYN4655	SJN7598A	6809402A62	3	Danish
SE0005AB1B1 SE0007AB1B1	SE0007BccB1 SE0012BccB1	SE0006BccB1 SE0013BccB1	SYN6718 or SYN4656	SJN7609A	6809402A74	1	English (UK)
SE0007AB1C1	SE0007BccC1	SE0006BccC1	SYN4655	SJN7599A	6809402A63	3	Finnish

	SE0007BccD1	SE0006BccD1	SYN4655	SJN7602A	6809402A66	4	Dutch
	SE0007BccE1 SE0012BccE1	SE0006BccE1 SE0013BccE1	SYN4655	SJN7604A	6809402A68	2	French
SE0007AB1F1	SE0007BccF1	SE0006BccF1	SYN4655	SJN7608A	6809402A73	2	German
	SE0007BccG1	SE0006BccG1	SYN4655	SJN7600A	6809402A64	4	Greek
	SE0007BccH1	SE0006BccH1	SYN4655	SJN7607A	6809402A72	2	Italian
SE0007AB1J1	SE0007BccJ1	SE0006BccJ1	SYN4655	SJN7597A	6809402A61	3	Norwegian
	SE0007BccK1	SE0006BccK1	SYN4655	SJN7601A	6809402A65	4	Portuguese
	SE0007BccL1	SE0006BccL1	SYN4655	SJN7603A	6809402A67	4	Spanish
SE0007AB1M1	SE0007BccM1	SE0006BccM1	SYN4655	SJN7606A	6809402A71	3	Swedish
	SE0007BccN1	SE0006BccN1	SYN4655	SJN7602A & SJN7604A	-	-	Belgium Package
SE0005AB1P1	SE0007BccP1	SE0006BccP1	SYN4655	SJN7604A, SJN7607A & SJN7608A	-	-	Swiss Package
	SE0007BccQ1	SE0006BccQ1	SYN4655	SJN7595A	6809402A59	5	Turkish
	SE0007BccR1	SE0006BccR1	SYN4655	SJN7596A	6809402A60	5	Hungarian
	SE0007BccS1	SE0006BccS1	SYN4655	SJN7572A	6809402A56	5	Slovakian
	other models	other models	n/a	SJN7610A	6809402A75	2	Arabic
	SE0007BccT1	SE0006BccT1	SYN4655	SJN7604A SJN7609A & SJN7610A	-	-	North Africa Package
SE0007AB1U1	SE0007BccU1	SE0006BccU1	SYN4655	SJN7593A	6809402A57	5	Russian
SE0007AB1V1	SE0007BccV1	SE0006BccV1	SYN4655	SJN7792A	6809408A62	5	Lithuanian
	SE0007BccW1	SE0006BccW1	SYN4655	SJN7571A	6809402A55	5	Polish
	SE0007BccY1	SE0006BccY1	SYN4655	SJN7793A	6809408A63	5	Czech
	SE0007BccZ1	SE0006BccZ1	SYN4655	none	none	-	No language
SE0005AB1B2	SE0007BccB2	SE0006BccB2	SYN4655	SJN7609A	6809402A74	1	English for South Africa
	SE0007BccC2	SE0006BccC2	SYN4655	SJN8173A	6909413A02	5	Croatian
	SE0007BccF2	SE0006BccF2	SYN4655	SJN7608A	6809402A73	2	German for Austria
	SE0007BccG2	SE0006BccG2	SYN6718 or SYN4656	SJN7600A	6809402A64	5	Cyprus
	SE0007BccP2	SE0006BccP2	SYN4655	SJN8174A	6909413A03	5	Romanian
	SE0007BccS2	SE0006BccS2	SYN4655	SJN8175A	6909413A04	5	Slovenian
	SE0007BccT2	SE0006BccT2	SYN6718 or SYN4656	SJN7604A SJN7609A & SJN7610A		-	Gulf States Package
	SE0007BccU2	SE0006BccU2	SYN4655	SJN8176A	6909413A05	5	Ukrainian
	SE0007BccX2	SE0006BccX2	SYN4655	SJN8180A	6909413A09	5	Israeli
	SE0007BccZ2	SE0006BccZ2	SYN6718 or SYN4656	none	none	-	No language
	SE0007BccA3	SE0006BccA3	SYN4655	SJN8177A	6909413A06	5	Latvian
	SE0007BccC3	SE0006BccC3	SYN4655	SJN8178A	6909413A07	5	Estonian

	SE0007BccA4	SE0006BccA4	SYN4655	SJN8179A	6909413A08	5	Bulgarian
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Table 2: Literature Kits			Kit Number	Market	Kit Contents
Stage I Flipped ZAP	Stage II Flipped ZAP	Stage III Flipless ZAP			
SE0007AB1A1	SE0007BccA1 SE0012BccA1	SE0006BccA1 SE0013BccA1	SJN8356AA	Denmark	Accessory Leaflet - 68P09414A66 Invalid Battery - 68P09415A29
SE0007AB1B1	SE0007BccB1 SE0012BccB1	SE0006BccB1 SE0013BccB1	SJN8356AB	UK	Accessory Leaflet - 68P09414A67 Registration Card - 68P09408A20 Invalid Battery - 68P09415A30
SE0007AB1C1	SE0007BccC1	SE0006BccC1	SJN8356AC	Finland	Accessory Leaflet - 68P09414A68 Invalid Battery - 68P09415A31
	SE0007BccD1	SE0006BccD1	SJN8356AD	Netherlands	Accessory Leaflet - 68P09414A69 Registration Card - 68P09408A24 Invalid Battery - 68P09415A32
	SE0007BccE1 SE0012BccE1	SE0006BccE1 SE0013BccE1	SJN8356AE	France	Accessory Leaflet - 68P09414A70 Registration Card - 68P09408A21 Invalid Battery - 68P09415A33
SE0007AB1F1	SE0007BccF1	SE0006BccF1	SJN8356AF	Germany	Accessory Leaflet - 68P09414A71 Registration Card - 68P09408A22 24 Hour Service - 68P09405A07 Invalid Battery - 68P09415A34
	SE0007BccG1	SE0006BccG1	SJN8356AG	Greece	Accessory Leaflet - 68P09414A72 Invalid Battery - 68P09415A35
	SE0007BccH1	SE0006BccH1	SJN8356AH	Italy	Accessory Leaflet - 68P09414A73 Invalid Battery - 68P09415A36
SE0007AB1J1	SE0007BccJ1	SE0006BccJ1	SJN8356AJ	Norway	Accessory Leaflet - 68P09414A74 Invalid Battery - 68P09415A37
	SE0007BccK1	SE0006BccK1	SJN8356AK	Portugal	Accessory Leaflet - 68P09414A75 Warranty Card - 68P09405A09 Invalid Battery - 68P09415A38
	SE0007BccL1	SE0006BccL1	SJN8356AL	Spain	Accessory Leaflet - 68P09414A76 Registration Card - 68P09408A23 Warranty Card - 68P09405A08 Invalid Battery - 68P09415A39
SE0007AB1M1	SE0007BccM1	SE0006BccM1	SJN8356AM	Sweden	Accessory Leaflet - 68P09414A77 Invalid Battery - 68P09415A40
	SE0007BccN1	SE0006BccN1	SJN8356AN	Belgium	Accessory Leaflet - 68P09414A78 Invalid Battery - 68P09415A32 Invalid Battery - 68P09415A33
SE0005AB1P1	SE0007BccP1	SE0006BccP1	SJN8356AP	Switzerland	Accessory Leaflet - 68P09414A79 Invalid Battery - 68P09415A33 Invalid Battery - 68P09415A34 Invalid Battery - 68P09415A36
	SE0007BccQ1	SE0006BccQ1	SJN8356AQ	Turkey	Accessory Leaflet - 68P09414A80 Invalid Battery - 68P09415A41
	SE0007BccR1	SE0006BccR1	SJN8356AR	Hungary	Accessory Leaflet - 68P09414A81 Invalid Battery - 68P09415A42
	SE0007BccS1	SE0006BccS1	SJN8356AS	Slovakia	Accessory Leaflet - 68P09414A82

					Invalid Battery - 68P09415A43
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	Other models	Other models	SJN8356AT	Arab/Eng./French	Accessory Leaflet - 68P09414A83 Invalid Battery - 68P09415A44
	SE0007BccT1	SE0006BccT1	SJN8356AT	North Africa	Accessory Leaflet - 68P09414A83 Invalid Battery - 68P09415A30 Invalid Battery - 68P09415A33 Invalid Battery - 68P09415A44
SE0007AB1U1	SE0007BccU1	SE0006BccU1	SJN8356AU	Russia	Accessory Leaflet - 68P09414A84 Invalid Battery - 68P09415A45
SE0007AB1V1	SE0007BccV1	SE0006BccV1	SJN8356AV	Lithuania	Accessory Leaflet - 68P09414A85 Invalid Battery - 68P09415A46
	SE0007BccW1	SE0006BccW1	SJN8356AW	Poland	Accessory Leaflet - 68P09414A86 Invalid Battery - 68P09415A47
	SE0007BccY1	SE0006BccY1	SJN8356AX	Czech Republic	Accessory Leaflet - 68P09414A87 Invalid Battery - 68P09415A48
	SE0007BccZ1	SE0006BccZ1	none	Generic- Euro Plug	none
SE0005AB1B2	SE0007BccB2	SE0006BccB2	SJN8491AA	South Africa	Accessory Leaflet - 68P09414A67 Invalid Battery - 68P09415A30
	SE0007BccC2	SE0006BccC2	SJN8356AY	Croatia	Accessory Leaflet - 68P09414A88 Invalid Battery - 68P09415A52
	SE0007BccF2	SE0006BccF2	SJN8489AA	Austria	Accessory Leaflet - 68P09414A71 Registration Card - 68P09408A22 24 Hour Service - 68P09414A16 Invalid Battery - 68P09415A34
	SE0007BccG2	SE0006BccG2	SJN8356AZ	Cyprus	Accessory Leaflet - 68P09414A89 Invalid Battery - 68P09415A35
	SE0007BccP2	SE0006BccP2	SJN8490AA	Romania	Accessory Leaflet - 68P09414A90 Invalid Battery - 68P09415A51
	SE0007BccS2	SE0006BccS2	SJN8492AA	Slovenia	Accessory Leaflet - 68P09416A79 Invalid Battery - 68P09415A50
	SE0007BccT2	SE0006BccT2	SJN8493AA	Gulf States	Accessory Leaflet - 68P09414A83 Invalid Battery - 68P09415A30 Invalid Battery - 68P09415A33 Invalid Battery - 68P09415A44
	SE0007BccU2	SE0006BccU2	SJN8357AA	Ukraine	Accessory Leaflet - 68P09414A91 Invalid Battery - 68P09415A55
	SE0007BccX2	SE0006BccX2	SJN8357AB	Israel	Accessory Leaflet - 68P09414A92
	SE0007BccZ2	SE0006BccZ2	none	Generic- UK Plug	none
	SE0007BccA3	SE0006BccA3	SJN8357AC	Latvia	Accessory Leaflet - 68P09414A93 Invalid Battery - 68P09415A54
	SE0007BccC3	SE0006BccC3	SJN8357AD	Estonia	Accessory Leaflet - 68P09414A94 Invalid Battery - 68P09415A49
	SE0007BccA4	SE0006BccA4	SJN8357AE	Bulgaria	Accessory Leaflet - 68P09414A95 Invalid Battery - 68P09415A53

Note: Italian packages also require the following unique items added to their BOMS:

1 x Loyalty Card (68P09413A84)

2 x Security stickers (5402318T04)

5.5 Service Requirements

The following items are required for service:

- a Service Transceiver with IMEI, with no accessories / manual /etc
Part numbers are:
Flipped ZAP (Stage I; Non EFR models): S8332A
Flipped ZAP (Stage II; EFR models): S8323A
Flipless ZAP (Stage III; EFR models): S8324A
- a spare Printed Circuit Board (PCB), fully phased and tested, with an IMEI.

6. PACKAGING/LABELLING REQUIREMENTS

6.1 Box sizes and packaging materials

Two one piece boxes will be developed for all ZAP packages worldwide.

The 'Standard ZAP' box will be capable of packing the following components:

- Flipped or Flipless Transceiver, face-up, at top of package
- Either a AAA Long NiMH or LGQ8 LiIon or AA NiMH battery
- Either AAA or AA battery door
- Leather or Plastic Holster
- Universal Travel Charger
- Headset Adapter and Earpiece accessory (PHFA kit)
- 1 plug (either UK, Euro, US, Aus/NZ or Indian)
- Up to 3 single language, A6 manuals
- Literature Kit

Outside dimensions of the standard pack (for sleeving purposes) are: 184 x 248 x 72mm.

The 'Extended ZAP' box will be capable of packing everything in Standard ZAP box, plus the following components:

- Either Desktop charger or Cigarette Lighter Adapter
- Either a AA NiMH or Performance Leadership LiIon battery (ie second battery)
- Either a AA or Triple Stacked battery door
- A second plug
- As an alternative to the three A6 manuals, two A5 could be an option for this box

All packaging materials should be environmentally friendly. The Pulp insert may be coloured Motorola blue.

Artwork: for Stage I, standard Motorola artwork will be used on the new packaging. For Stages II and III, new WINGS branded artwork has been defined.

6.2 Labels

Transceiver labels placed in the factory will include 'MOTOROLA' and 'Made in'.

Transceiver labels placed in Distribution will include the following information:

‘**Model:**’ plus model number

‘**Type:**’ plus Type name

‘**MSN:**’ plus MSN in human readable format

‘**IMEI:**’ plus IMEI in human readable format (with section spacers and check digit)
IMEI in bar code 128 format

‘**CE0168X**’ in characters a minimum of 5mm in height

Space must be allowed for the code ‘**S/L**’ for SIM Locked models and for co-branding operator names of upto 10 letters.

European Box labels will include the following:

‘**Made in**’ in the header

‘**Motorola**’ plus product name (ie ‘**cd920**’ or ‘**cd930**’ in the header

‘**GSM900/1800**’ in the header

‘**CE**’ in the header

Der Grüne Punkt mark in the header

Sequence number in human readable and bar code (format 39)

Model number in human readable and bar code (format 39)

MSN in human readable and bar code (format 39)

IMEI in human readable (with section spacers and check digit) and bar code (format 39)

EAN in human readable and bar code

T-Options in human readable and bar code

Space must be allowed for the OBO text.

NOTE: The presentation of IMEI will be the new Phase II format, which matches the IMEI is the display (ie with 15th check digit) in all human readable forms.

6.3 EANs

Black models will be defined for all countries; other colours will be defined as required.

Mkt/Colour	Stage I ZAP	EAN	Stage II ZAP	EAN	Stage III ZAP	EAN
Denmark:						
- Black	SE0007AB1A1	50 25322 191620	SE0007BB1A1	50 25322 191620	SE0006BB1A1	50 25322 191 965
- Blue						
- Grey						
- Black CPHS	SE0012AB1A1	50 25322 192 306	SE0012BB1A1	50 25322 192 306	SE0013BB1A1	50 25322 192 351
UK:						
- Black	SE0005AB1B1/ SE0007AB1B1	50 25322 191 637	SE0007BB1B1	50 25322 191 637	SE0006BB1B1	50 25322 191 972
- Blue						
- Grey						
- Black CPHS	SE0012AB1B1	50 25322 192 313	SE0012BB1B1	50 25322 192 313	SE0013BB1B1	50 25322 192 368
Finland:						
- Black	SE0007AB1C1	50 25322 191 644	SE0007BB1C1	50 25322 191 644	SE0006BB1C1	50 25322 191 989
- Blue						
- Grey						
Netherlands:						
- Black			SE0007BB1D1	50 25322 191 651	SE0006BB1D1	50 25322 191 996
- Blue						
- Grey						
France:						
- Black			SE0007BB1E1	50 25322 191 668	SE0006BB1E1	50 25322 192 009
- Blue						

- Grey - Black CPHS			SE0012BB1E1	50 25322 192 320	SE0013BB1E1	50 25322 192 375
Germany: - Black - Blue - Grey	SE0007AB1F1	50 25322 191 675	SE0007BB1F1	50 25322 191 675	SE0006BB1F1	50 25322 192 016

Greece: - Black - Blue - Grey			SE0007BB1G1	50 25322 191 682	SE0006BB1G1	50 25322 192 023
Italy: - Black - Blue - Grey			SE0007BB1H1	50 25322 191 699	SE0006BB1H1	50 25322 192 030
Norway: - Black - Blue - Grey	SE0007AB1J1	50 25322 191 705	SE0007BB1J1	50 25322 191 705	SE0006BB1J1	50 25322 192 047
Portugal: - Black - Blue - Grey			SE0007BB1K1	50 25322 191 712	SE0006BB1K1	50 25322 192 054
Spain: - Black - Blue - Grey			SE0007BB1L1	50 25322 191 729	SE0006BB1L1	50 25322 192 061
Sweden: - Black - Blue - Grey	SE0007AB1M1	50 25322 191 736	SE0007BB1M1	50 25322 191 736	SE0006BB1M1	50 25322 192 078
Belgium: - Black - Blue - Grey			SE0007BB1N1	50 25322 191 743	SE0006BB1N1	50 25322 192 085
Switzerland: - Black - Blue - Grey	SE0005AB1P1	50 25322 191 750	SE0007BB1P1	50 25322 191 750	SE0006BB1P1	50 25322 192 092
Turkey: - Black - Blue - Grey			SE0007BB1Q1	50 25322 191 767	SE0006BB1Q1	50 25322 192 108
Hungary: - Black - Blue - Grey			SE0007BB1R1	50 25322 191 774	SE0006BB1R1	50 25322 192 115
Slovak Rep. : - Black - Blue - Grey			SE0007BB1S1	50 25322 191 781	SE0006BB1S1	50 25322 192 122
ME (NAfrica) - Black - Blue - Grey			SE0007BB1T1	50 25322 191 798	SE0006BB1T1	50 25322 192 139
Russia: - Black - Blue - Grey	SE0007AB1U1	50 25322 191 804	SE0007BB1U1	50 25322 191 804	SE0006BB1U1	50 25322 192 146
Lithuania: - Black - Blue - Grey	SE0007AB1V1	50 25322 191 811	SE0007BB1V1	50 25322 191 811	SE0006BB1V1	50 25322 192 153

Poland: - Black - Blue - Grey			SE0007BB1W1	50 25322 191 828	SE0006BB1W1	50 25322 192 160
Czech Rep. : - Black - Blue - Grey			SE0007BB1Y1	50 25322 191 835	SE0006BB1Y1	50 25322 192 177
No Ln (Euro): - Black - Blue - Grey			SE0007BB1Z1	50 25322 192 337	SE0006BB1Z1	50 25322 192 382
South Africa: - Black - Blue - Grey	SE0005AB1B2/ SE0007AB1B2	50 25322 191 842	SE0007BB1B2	50 25322 191 842	SE0006BB1B2	50 25322 192 184
Croatia: - Black - Blue - Grey			SE0007BB1C2	50 25322 191 859	SE0006BB1C2	50 25322 192 191
Austria: - Black - Blue - Grey			SE0007BB1F2	50 25322 191 866	SE0006BB1F2	50 25322 192 207
Cyprus: - Black - Blue - Grey			SE0007BB1G2	50 25322 191 873	SE0006BB1G2	50 25322 192 214
Romania: - Black - Blue - Grey			SE0007BB1P2	50 25322 191 880	SE0006BB1P2	50 25322 192 221
Slovenia: - Black - Blue - Grey			SE0007BB1S2	50 25322 191 897	SE0006BB1S2	50 25322 192 238
ME (Gulf) - Black - Blue - Grey			SE0007BB1T2	50 25322 191 903	SE0006BB1T2	50 25322 192 245
Ukraine: - Black - Blue - Grey			SE0007BB1U2	50 25322 191 910	SE0006BB1U2	50 25322 192 252
Israel: - Black - Blue - Grey			SE0007BB1X2	50 25322 191 927	SE0006BB1X2	50 25322 192 269
No Ln (UK): - Black - Blue - Grey			SE0007BB1Z2	50 25322 192 344	SE0006BB1Z2	50 25322 192 399
Latvia: - Black - Blue - Grey			SE0007BB1A3	50 25322 191 934	SE0006BB1A3	50 25322 192 276

Estonia: - Black - Blue - Grey			SE0007BB1C3	50 25322 191 941	SE0006BB1C3	50 25322 192 283
Bulgaria: - Black - Blue - Grey			SE0007BB1A4	50 25322 191 958	SE0006BB1A4	50 25322 192 290

7. PRODUCT NAME/MARKET NAME

The internal name for this product is ZAP. The pre-launch name of the product that can be used with customers is 'Platform Z'. This name is to be used as a precaution against the name ZAP becoming adopted by the market. The final market names for the different models are below.

	Europe	Asia	Pan-America
Stage I	cd920	cd928	n/a
Stage II	cd920	n/a	<i>g929</i>
Stage III	cd930	cd938	<i>g939</i>

8. SAMPLE SCHEDULE

This list will be constantly updated as new requirements are submitted.

9. TYPE APPROVAL

Full Phase II Type Approval was obtained for the ZAP Platform on 16 March, 1998. Type approval should simultaneously be sought in Asia. Type approval should then be supported and obtained in the following countries outside the European Community:

- Russia - Hungary - Poland
- Ukraine - Israel

The following Type names will be used in European Type Approval:

Stage I & II, Flipped MC2-41B11

Stage III, Flipless MC2-41B12

The TAC awarded for MC2-41B11 is: 447768

with the following FACs: 69 (Harvard), 07 (Flensburg) and 40 (Easter Inch)

and initial range from: 425 425 to 725 424.

The phone, the Rapid Travel Charger and Data accessories must also have CE approval.

All models must be Year 2000 compliant.

10. ACCESSORIES & COMPATIBILITY

See separate Accessories product description for full details of the accessory development plan.
All accessories are required for launch, unless otherwise stated.

10.1 Current

Part Number	POS Number	Name	Availability Notes
SYN4241	CLA9000	Cigarette Lighter Adapter	As StarTAC™
SPN4278	CHA9000 (Eur) CHA9010 (UK)	Universal Rapid Travel Charger	As StarTAC™
SYN6718	n/a	UK Plug	As StarTAC™
SYN4655	n/a	Euro Plug	As StarTAC™
SYN4694	n/a	Aus/NZ Plug	As StarTAC™
SYN4696	n/a	Indian Plug	As StarTAC™
SYN4657	n/a	US Plug	As StarTAC™
SKN4821	n/a	PC Card to Phone Connector Cable	As StarTAC™
S6112	PCC9100	CELlect™ 1+ German/English	As StarTAC™
S6113	n/a	CELlect™ 1+ French	As StarTAC™
S6114	n/a	CELlect™ 1+ Italian / Spanish	As StarTAC™
CD1181	n/a	CELlect™ 3 Denmark	As StarTAC™
CD1177	n/a	CELlect™ 3 Germany	As StarTAC™
CD1183	n/a	CELlect™ 3 Finland	As StarTAC™
CD1179	n/a	CELlect™ 3 France	As StarTAC™
CD1175	n/a	CELlect™ 3 Italy	As StarTAC™
CD1182	n/a	CELlect™ 3 Norway	As StarTAC™
CD1178	n/a	CELlect™ 3 Sweden	As StarTAC™
CD1180	n/a	CELlect™ 3 Switzerland	As StarTAC™
CD1176	PCC9300	CELlect™ 3 UK	As StarTAC™
SYN6962	n/a	Universal Headset and microphone	Same all products

10.2 Planned

Part Number	POS Number	Name	Availability Notes
SNN5089	n/a	Weight Leadership LiIon 400 mAh battery	Jan. '98
SNN5291	BNS6070	AAA Long NiMH 650 mAh battery	Jan. '98
SNN5360	BLS6100	LGQ8 LiIon 1000 mAh battery	Jan. '98
SNN5307	BNX6100	AA NiMH 1100 mAh battery	March '98
SNN5260	n/a	Performance Leadership LiIon 2800 mAh	March '98
SHN6618	n/a	Extended AA battery door - Black	Jan. '98
SHN6829	n/a	Extended AA battery door - Grey	
SHN6944	n/a	Extended AA battery door - Blue	
1504768Z01	n/a	AA Dry Cell battery carrier	TBD
SHN6975	n/a	Performance Leadership battery door - Blk	March '98
SHN6827	n/a	Performance Leadership battery door - Gry	
SHN6945	n/a	Performance Leadership battery door - Blu	
SPN4523	CHA6100	Desktop Charger	May '98
SYN6719	n/a	Headset Adapter	May '98
SYN6911	HUC6000	Hang-up Cup	May '98
SLN3940	HSK6000	Headset Adapter and Headset/Microphone	May '98

SHN6851	CCA6100	Plastic Holster	May '98
SYN6913	n/a	Leather Pouch - with flip top	May '98
SYN7380	CCA6000	Leather Holster - with rotating belt clip	July '98
CD1310	PCC6000	Smart CELlect Data Cable & Soft Modem	July '98
S8142	HFK6200	Professional Car Kit with DSP	May '98
S8141	TBD	Professional Car Kit with DSP & VR	Q3, '98
SLN3901	HFK6100	Basic Car Kit	Q3, '98
TBD	TBD	Wireless Headset adapter and Earpiece	Q3, '98

APPENDIX 1: SPECIFIC MODEL REQUIREMENTS

A1 Diagram of Flipped ZAP

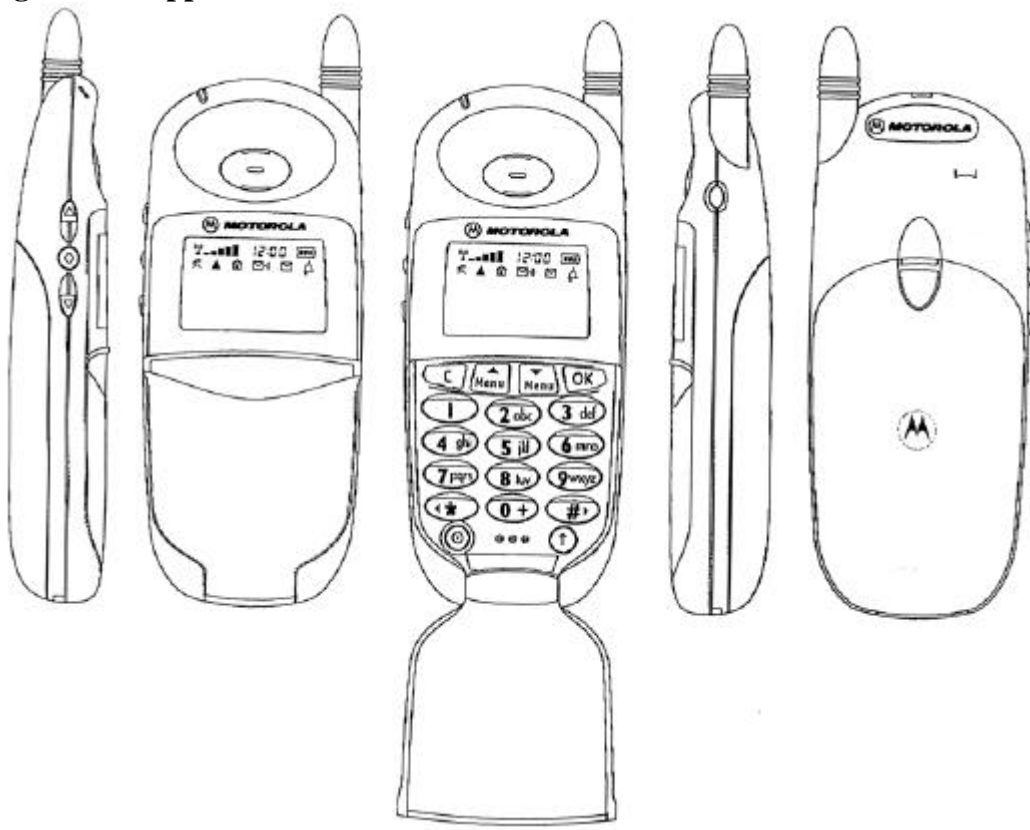
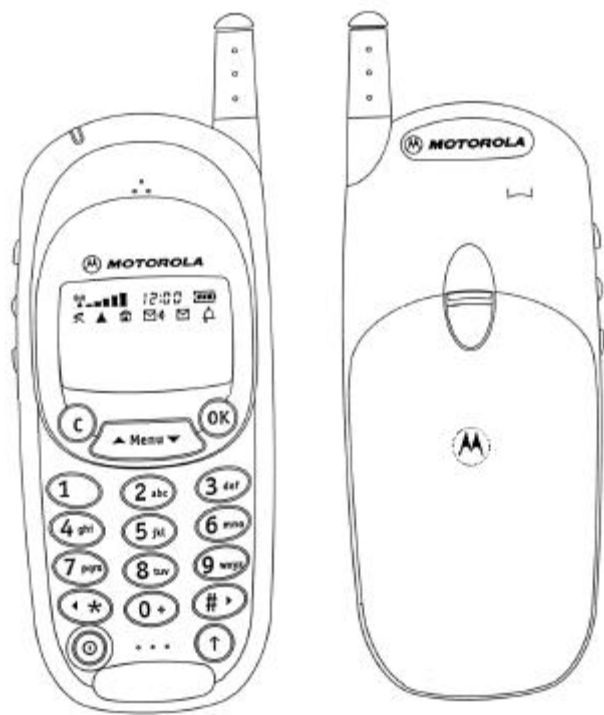


Diagram of Flipless ZAP



A2 Initial Coloured Housing Requirements

Stages I and II: Flipped	Black	Magix Grey	Ten Pin Blue
Lens Surround	Black	Silver MM524	Black
Lens Printing	Pantone 427	Bright White	Pantone 427
Front Escutcheon Part Number	54-09397-M08	54-09397-M09	54-09397-M08
Front Escutcheon Background	Black	Silver MM524	Black
Front Escutcheon Finish	Polished	Polished	Polished
Front Escutcheon Printing	Pantone 427	Bright White	Pantone 427
Back Escutcheon Part Number	54 09158-T04	54 09158-T04	54 09158-T04
Back Escutcheon Background	Black	Black	Black
Back Escutcheon Finish	Domed	Domed	Domed
Back Escutcheon Printing	Pantone 427	Pantone 427	Pantone 427
Keypad Background	Black	Black	Black
Keypad Finish	Hard	Hard	Hard

Stage III: Flipless	Black	Magix Grey	Ten Pin Blue
Lens Surround	Black	Silver MM524	Black
Lens Printing	Pantone 427	Bright White	Pantone 427
Front Escutcheon Part Number	13-09432-U04	13-09432-U05	13-09432-U04
Front Escutcheon Background	Black	Silver MM524	Black
Front Escutcheon Finish	as body	as body	as body
Front Escutcheon Printing	Pantone 427	Bright White	Pantone 427
Back Escutcheon Part Number	54 09158-T04	54 09158-T04	54 09158-T04
Back Escutcheon Background	Black	Black	Black
Back Escutcheon Finish	Domed	Domed	Domed
Back Escutcheon Printing	Pantone 427	Pantone 427	Pantone 427
Keypad Background	Black	Black	Black
Keypad Finish	Silicon	Silicon	Silicon

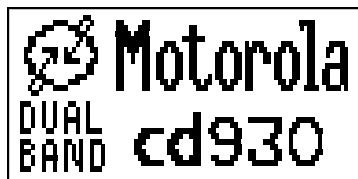
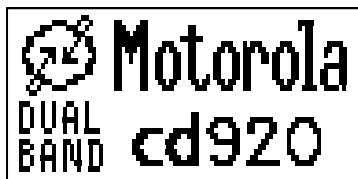
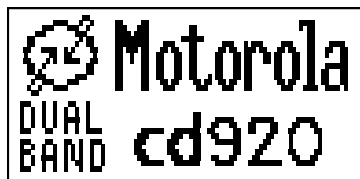
Note: Ten Pin Blue is defined as Pantone 296C

A3 Flexing Defaults

Below is a list of the most important default flexing settings:

Feature	Flex Default
Operating Bands	Band-Aware GSM 900 / 1800
Network Selection	Automatic
Network Search Frequency	Medium
SIM Lock	None
Home Zone	None
CPHS Feature Package	Off
VMWI Type	GSM Phase II+ implementation
Emergency Number	112
Data	9600 baud
Extended Menus	Off
Ringer	Standard Tone
Ringer Volume	Maximum
Earpiece Volume	Maximum
Keypad Tone	Normal Tones
Greeting Tone	On
Language	Automatic
Keypad Lock	Flip locks keypad when closed (Stage I and II) # and * keys lock keypad (Stage III)
Key Answer Only	Off (Stages I and II only)
Phone Lock	Off
Phone Lock Number	1234
Security Code	000000
Battery Saving Mode	On
In-Call Display	Off
Single Alert Timer Length	30 seconds
Repetitive Timer Length	60 seconds
Phone Book Access	No Restrictions
CLI Alpha Tag Lookup	On
One-Touch dialling	to SIM Memory
Quick Access	User definable
Voicemail Number	from Phone Memory
LED Status Indicator	On
Power key delays	Delay on Power On and Power Off

Wake Up Graphics:*Stage I**Stage II**Stage III*



A4 Menu Requirements

QA	VN	MENU				
Quick Access	VoiceNote	Phonebook	Call Related Features	Messages	Phone Setup	Netw

GSM900/1800 ZAP, Issue 8.0

Assigned Functions: 1- Find Name 2- Add to SIM 3- Call Voicemail 4- Battery Meter 5- Play VoiceNote 6- Mute On/Off 7- Read Messages 8- Vibrate On/Off 9- Divert On/Off Available Functions: • Find by Name • Find by Location • Add Entry to Phone • Add Entry to SIM • Call Voicemail • Battery Meter • Phone Lock Now • Phone Mute On/Off • Ring Volume • Vibrate On/Off • Ringer On/Off • Divert All Voice Calls • Switch Memory • Read Messages • Outgoing Messages • Message Editor • Last Calls Received • Last Call Charge • Last Call Timer • Talk and Fax • Show My ID Next Call • Restrict my ID • Key Answer Only • Switch Line 1/2 • Show Services • Play VoiceNote • Divert Voice Call	• Recording ...	• Personal Numbers • Find Entry By Name • < Personal Numbers > • Call Number • Modify Name or No • Erase Name and No • Find Entry By Location • < Personal Numbers > • Call Number • Modify Name or No • Erase Name and No • Add Entry • Add To Phone Memory • Add To SIM Card Mem • Check Capacity • Check Phone Capacity • Check SIM Capacity • Prevent Access • To SIM Card Memory • To Phone Memory • To Phone & SIM Mem • No Memory Restriction • Copy SIM Memory • Show Services • Last Ten Calls • Last Calls Made • Last Calls Received • Erase All Numbers • My Phone Number(s) • < MSISDN List > • Fixed Dialling ² • View Fixed Dial List • < Fixed Dial List > • Setup Fixed Dialling • < Enter PIN2 > • On • Off • Edit Entry • < Fixed Dial List > • Add Entry • Erase Entry • One Touch Dial Setting • To Phone Memory • To SIM Card • To Fixed Dial List ²	• Show Battery Meter • Restrict My Phone Number • Show ID On Next Call • Restrict ID On Next Call • Call Diverting • Divert All Voice Calls • Divert Voice Calls • Divert When Unavail. • Submenu-1 • Divert All Voice Calls • Submenu-1 • Detailed Diverting • If Busy • Submenu-1 • If Not Reachable • Submenu-1 • If No Answer • Submenu-1 • Divert Fax Calls • Submenu-1 • Divert Data Calls • Submenu-1 • Cancel All Diverting • Talk and Fax • On/Off • Call Waiting • On/Off • Call Barring • Bar Outgoing Calls • Int'l Calls • Int'l Calls Ex Home • All Calls • Off • Bar Incoming Calls • When Roaming • All Calls • Off • Cancel All Barring • Change Bar Password • Key Answer Only *** • On • Off	• Call Voicemail • Received Messages • < Message List > • Delete Message • Return Call • Edit Message • < Message Editor> • Send Message • Store Message • Go To Next Message • Outgoing Messages • < Message List > • Send Message • Edit Message • < Message Editor> • Send Message • Store Message • Delete Message • Go To Next Message • Message Editor • Send Message • Store Message • VoiceNotes • Play VoiceNotes • < Playing ... > • Go To Next • Show Time Available • Erase All VoiceNotes • Cell Broadcast • On/Off • Message Settings • Voicemail Number • Service Centre • Expiry Period • Outgoing Message Type • Text • Fax • X400 • Paging • E-mail • ERMES • Voice	Select Phone Line Line 1 Line 2 • Adjust Ring Volume • < Volume Keys > • Ring or Vibrate • Ring Only • Vibrate Only • Vibrate Then Ring • No Ring Or Vibrate • Ringer On or Off • On/Off • Set Ringer Tone • Standard Tone ... etc • Set Ringer Tone 2 • Standard Tone ... etc • Phone Lock • Automatic Lock • On/Off • Lock Now • Change Unlock Code • Require SIM Card PIN • On/Off • Change SIM PIN Code • Change SIM PIN2 Code ² • New Security Code • Extended Menus • On/Off • Show Time and Date • Set Time and Date • Set Time Format • Language Selection • Dansk • ... • Türkce • Automatic • Change Greeting • Battery Saving Mode • On/Off • Select Keypad Tones • Normal Tones • Single Tones • No Tones • Phone Status • Status Review • Master Reset • Master Clear	• Available • < PLMN • Reg • Mak • Network • Registr • Auth • Mar • Freque • Slov • Mec • Fas • Cor • Preferre • Add Ne • Cho • Chc • Add • Show L • < PL • I • I • Find New
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Menu Key: • flex on; + flex on but not shown in manual; **Bold** are CSP controlled; *Italics* are in Extended Menus; menus marked ² ap
 ** New features; to be confirmed. *** Not required for Flipless ZAP (Stage III).

A5 Specifications of Competitors' Products

	Standard Package	Best Performance	Strengths
Motorola cd920 or cd930	Size (cc) 139 Weight (gm) 145 Talk time (mins) 210-270 Standby time (hrs) 90-105	Smallest size (cc) 139 Lowest weight (gm) 120 Talk time (mins) 480-600 Standby time (hrs) 200-250	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Ergonomic designs • VoiceNote™ & VibraC • Optimax™ display
Ericsson sh888 or sf888	Size (cc) 140 Weight (gm) 195 Talk time (mins) 210-265 Standby time (hrs) upto 80	Smallest size (cc) * Lowest weight (gm) 173 Talk time (mins) 315-400 Standby time (hrs) upto 120	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Internal data card built-in • Infra-Red port • Enhanced Full Rate Codec
Nokia 6150 (Dual-band version of 6110; expected end Q3-98)	Size (cc) 130 Weight (gm) 142 Talk time (mins) 180-300 Standby time (hrs) 60-260	Smallest size (cc) 130 Lowest weight (gm) 142 Talk time (mins) 300-480 Standby time (hrs) 100-450	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Infra-Red port • Reminders and Games • Call Screening
Siemens S15	Size (cc) 160 Weight (gm) 185 Talk time (mins) upto 180 Standby time (hrs) upto 80	Smallest size (cc) 160 Lowest weight (gm) 185 Talk time (mins) upto 600 Standby time (hrs) upto 220	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Easy to use • Dynamic character size • Calculator function
Bosch Dual-Com 738	Size (cc) * Weight (gm) 192 Talk time (mins) 200 Standby time (hrs) 80	Smallest size (cc) * Lowest weight (gm) 174 Talk time (mins) 575 Standby time (hrs) 220	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Belt clip accessory • Vibrating battery access • Calculator function
Mitsubishi MT-D30 (expected end Q2-98)	Size (cc) 168 Weight (gm) 185 Talk time (mins) upto 180 Standby time (hrs) upto 110	Smallest size (cc) 168 Lowest weight (gm) 185 Talk time (mins) upto 240 Standby time (hrs) upto 180	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Rocker menu key • Closed User Group • Conference Calling
NEC DB2000 (Low tier model G10 also expected Q3-98)	Size (cc) 100 Weight (gm) 120 Talk time (mins) upto 150 Standby time (hrs) upto 300	Smallest size (cc) 100 Lowest weight (gm) 120 Talk time (mins) upto 300 Standby time (hrs) upto 600	<ul style="list-style-type: none"> • Dualband (GSM900/1800) • Metallic finish • Vibrating alert as standard • LiIon battery as standard
Nortel/AEG/Matra 2785 (Expected end Q3-98)	Size (cc) * Weight (gm) * Talk time (mins) * Standby time (hrs) *	Smallest size (cc) * Lowest weight (gm) 165 Talk time (mins) 360 Standby time (hrs) 280	<ul style="list-style-type: none"> • Dualband PLUS E-GSM • 14,400 data capable • Handsfree mode • Voice control and callir

* Not currently known



Product Description



GSM Zap and Zap C (Refresh)

Created By: Jim Filicette-WJF005 on 22/04/98 at 16:21
Category: Review

Version Number: **4**

Hot Spot to PR Number Assignment database. This Hot Spot for use by ECSG personnel only.
[Click in Hot Spot, to view, or to generate a request for a Product Release \(PR\) number.](#)

PR Number: **A74-01 A74-02**

Motorola Confidential Proprietary

Insert Table in field below to define key changes. Go to Menu -> Create -> Table. Make table 4 columns wide.
Enter brief summary of any updates below:

Change Control:

Version Number	Date	Editor	Key Changes
1	4/22/98	Jim Filicette	Initial release of Zap refresh
2	5/25/98	Jim Filicette	Revisions to MMI per Steve Akin's 5/22/98 email. Add Tri-Codec and new vibrator Clarify stage IV and V of Zap refresh
3	6/10/98	Jim Filicette	Revise O2O feature Add Stage I unicode support for phone book to stage V Move VoiceNotes TM improvement to stage IV Add note to tri-codec (voice only HR)
4	6/?/98	Jim Filicette	Major Revisions: Add Eastern Euorpean Languages Clarify stages and features Add paint requirements Add manual, literature kit and model structure tables Add unique SMS alert, last 10 improvements, quick access software features to list.

Insert Table in field below to define release approvals. Go to Menu -> Create -> Table. Make table 3 columns wide.
When ready for release, submit for signatures. Define who signed below.
Each subsequent version change requires release signatures.

Release Approval Summary:

Version Number	Signed by	Date
1	Jim Filicette	
2	Tracey Koziol	
3	Ruchi Mangalik	
4	Neal Keating	
5	Doug Main	
6	Mike Hader	
7	Zaf Azam	
8	Philip Broderon	
9	Dave Loveridge	

Market Name:

Proposed: cd921 (EMEA Flip) cd931 (EMEA Flat)

Proposed: cd928e (ASIA Flip) cd938e (ASIA Flat)

Ship Authorization date:

01/SEPT/98 (use format DDMMYY)

Give a general introduction for this product requirement.

This product description covers the worldwide requirements for GSM 900/1800 Zap and Zap C REFRESH. It will have two stages which will be called: Zap stage IV and Zap stage V. Zap refresh will have a number of long awaited software MMI improvements plus improved keypad and vibrator hardware features.

Zap stage IV software release date is 20/JUL/98 for internal test and ship authorization requirement of 01/SEPT/98. Zap and Zap C will have simultaneous luanch dates.

Zap stage V will include an enhanced version of stage IV plus Tri-Codec support (half rate). Zap stage V goal for ship acceptance is 01/OCT/98.

Europe Plan:

Stage IV for Europe will require a product name change because of the numerous MMI improvements and hardware improvements (key pad and vibraCall™). Stage IV will also include painted housings on the flat version only. The proposed market name for Europe is cd921/cd931. Stage V for Europe will not require a product name change because Half Rate will be 'Soft' to the market (only operator).

Asia Plan:

Stage IV for Asia will require a product name change because of the numerous MMI improvements and hardware improvements (key pad and vibraCall™). The proposed market name for Asia is cd928e/cd938e. Stage V for Asia will not require a product name change because Half Rate support will be 'Soft' to the market (only operator). Asia plans to introduce manual band select to limited market on Aug 18, 1998 and full roll out on Sept 1, 1998.

Signaling Type:

GSM Dual Band

Define Key Selling Points and Message:

New key features in addition to previous versions for Zap Stage IV:

- Significant user interface enhancements
- Unicode for full SIM application toolkit class II plus stage I of Asian phone book
- Eastern European languages
- Improved keypad and VibraCallTM

New key features in addition to the above for Zap Stage V:

- Tri-Codec support (voice only HR)

The following are key selling features of previous versions of Zap cd920/cd930:

- Dual-Band technology, the quality capacity solution
- Best in class radio, battery and speaker performance
- Ergonomically designed for comfortable handling
- Value added service delivery through SIM Toolkit
- 3 minute VoiceNoteTM message recording feature
- Dual-Rate speech codec (FR and EFR)
- Ease of use
- Large, high contrast (OptimaxTM), easy to read display

Define Product Tier (High, Mid, or Low):

Mid Tier

Define Distribution Channel:

Same as cd920/cd930.

Define Competitors:

- Ericsson SH888; now shipping
- Nokia 6150, due end Q3-98
- Siemens S15; due end Q2-98
- Bosch Dual-Com 738; now shipping
- Mitsubishi MT-D30; due to launch in Q2-98
- NEC G10; due end Q3-98; and DB2000 also now due in Q3-98
- Nortel/AEG 2785; due in Q3-98

Define Key Target Customers:

Same as cd920 and cd930.

Define product tiering strategy, and any planned variants, for this product:

Zap is a product representing the mid tier.

Define Models to be Replaced by this Product:

Place cursor in field below. Go to Menu, select Create -> Table, then define number of rows you require, by 3 columns.

Model Name	Model Number	Comments
cd920	SE0007Bccxx	Stage II Flipped Zap
cd920	SE0012Bccxx	Stage II Flipped Zap w/ CPHS
cd930	SE0006Bccxx	Stage III Flat Zap
cd930	SE0013Bccxx	Stage III Flat Zap w/ CPHS

Define Target Markets:

Zap is positioned as a feature loaded product, aimed at power users. In particular, the Business Accomplishment and Activity Managment user segments will be targeted.

Define Advertising Requirements, Specifications to Advertise, and Key Message to be delivered:

To be developed in correlation to the Motorola Corporate Wings and brand awareness campaign. Advertising is to be consistent with cd920/cd930.

Define Phone Physical Characteristics. Insert drawings, photos, or other representation if available.

Zap refresh will not require any major modificaitons to the form factor. Flat Zap stage IV will include painted front, rear and battery door housings in various colors, including CeBit Motorola blue. These colors will be available at stage IV launch on 01/Sept/98.

Define Housing Physical Characteristics. Insert drawings, photos, or other representation if available.

Same as cd920 and cd930.

Define Battery Door Physical Characteristics. Insert drawings, photos, or other representation if available.

Painted battery doors will be required to match the housing colors and be available

Define Display Physical Characteristics. Insert drawings, photos, or other representation if available.

Same as cd920 and cd930.

Define Lens Physical Characteristics. Insert drawings, photos, or other representation if available.

Same as cd920 and cd930.

Define Keypad and Keypad Board Physical Characteristics. Insert drawings, photos, or other representation if available.

Zap stage IV will include an improved keypad that will adress the field complaints on Zap.

Define Escutcheon Physical Characteristics. Insert drawings, photos, or other representation if available.
New escutcheons will be needed for the new market names. The market names for Europe will be cd921 and cd931 for flip and flat respectively.

Define Antenna Physical Characteristics. Insert drawings, photos, or other representation if available.
Same as cd920 and cd930.

Define Connectivity Physical Characteristics. Insert drawings, photos, or other representation if available.
Same as cd920 and cd930.

Define SIM Card, and SIM Card Reader Physical Characteristics. Insert drawings, photos, or other representation if available.
Same as cd920 and cd930.

Define any other physical characteristics.
Zap stage IV will incorporate a new vibrator to improve the VibraCall™ feature. This will address complaints from the field on the quality of the vibrator. Zap should use the same vibrator that is being used in GSM 8700.

Define Transceiver Performance:

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Volume (cubic cm)	Weight (grams)	Talk Time (minutes)	Standby Time (hours)	With Battery (Name)
-------------------	----------------	---------------------	----------------------	---------------------

TALK/STANDBY TIMES - ZAP						
			DUAL BAND			3
			TX/DRX2	DTX/DRX9		
TX	---	ma	275	220	MKT	A P R I L
RX	---	ma	12.7	9.5		
Wgt	---	grams	99			
A. Nickel Metal Hydride						
TX	AAA - Long	650	2.4	3.0	2-3 hrs	1 9 9 8
RX	139cc	617.5	49	65	50-60 hrs	
Wgt	Wgt	48	147		147 g	
TX	AA	1100	4.0	5.0	4-5 hrs	
RX	150cc	1045	84	110	80-100 hrs	
Wgt	Wgt	83	182		193	
B. Lithium Ion						
TX	P5	400	1.5	1.8	1-1.5 hrs	
RX	139cc	380	30	40	30-40 hrs	
Wgt	Wgt	20	119		119 g	
TX	LP4 Saft	400	87	109	1-1.5 hrs	
RX	139cc	380	30	40	30-40 hrs	
Wgt	Wgt	23	122		122 g	
TX	LSQ8	1000	3.6	4.5	3.5-4.5 hrs	
RX	139cc	950	75	100	80-100 hrs	
Wgt	Wgt	45	144		144 g	
TX	Hi-Cap Pack	2800	10.2	12.7	10-12 hrs	
RX	189cc	2660	209	280	200-250 hrs	
Wgt	Wgt	124	223			
C. LiPolymer (Preliminary)						
TX	Lith Ploymer	480	105	131		
RX		456	36	48		
Wgt	Wgt	19	118			

Note: The above performance numbers are engineering estimates for Zap.

Define Battery Technology compatibility and Security requirements:
Same as cd920 and cd930. Zap refresh will also employ the invalid battery technology by utilizing the Dallas chip. Zap refresh will eliminate the invalid battery leaflet by integrating the information into the manual.

Define Charge Times with the sharger shipped as standard:		
Battery	Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.	
	Charge time with E. P. Standard Travel Charger to 90 % charge (Minutes)	Charge time with E. P. Desktop Charger to 90 % charge (Minutes)

Same as cd920 and cd930.

Define Data Compatibility:
Same as cd920 and cd930.

Define any requirements in general terms, or define overall requirements scope:
Zap refresh will have the same feature set as Zap stage III launch plus the new features below.

Key Software Requirements:

Define Key Software Requirements. Insert drawings, photos, or other representation if required, after table.

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.				
Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority
Features required in Zap refresh stage IV:				
0203	Viag Home Zone	In process and committed		1
0195	SIM Toolkit class 2	In process and committed		1
0196	Eastern European languages (not including Hebrew)	In process and committed		1
?*	Asian subsidy lock enhancement	In process and committed		1
0016	Unicode for SIM Toolkit	In process and committed		1
0115	SMS Delete all messages option	In process and committed		1
0023	MO-SMS reply to MT-SMS	In process and committed		1
0014	SMS Phone book access	In process and committed		1
?*	Manual band select for dual band (ASIA)	In process and committed		1
0155	Increase SIM ADN locations from 155- 255	In process and committed		1
?*	Increase SIM SMS locations from 35 to 75	In process and committed		1
0162	Support for CSP based on CPHS V4.2	In process and committed		1
?*	Change CLI lookup to use 8 digits	In process and committed		1
n/a	Check card software	In process and committed	Note: No MMI required	1
?*	Conference call / call transfer improvement	In process and committed		1
?**	Unicode phone book support-stage 1	Under investigation, NOT committed	Note: This feature could hold up Zap refresh launch date in Asia	1
0138**	Quick access additions (3)	In process and committed		1
0075**	Last 10 call improvements	In process and NOT committed		2
0028**	Unique SMS alert tones	In process and NOT committed		2
?*	Orange data field support	Under investigation, NOT committed		2
?*	O2O dual band CSP bit	Under investigation, not committed		2
Features required in Zap refresh stage V:				
0056**	Multi rate speach coder (FR/EFR/HR) (voice only HR)	In process and committed		1

Note:

* = denotes marketing specification is not available

** = denotes marketing specification is available

Priority:

1 = Required, will not ship without

2 = Will be considered for future product launch; will ship without

Transceivers:

Zap refresh for Europe will allow upto 14 languages per transceiver. The languages will be formatted in the following:

The first Zap Refersh transceiver will have the following languages:

English
French
German
Turkish
Italian
Spanish
Danish
Finnish
Dutch
Greek
Norwegian
Portugese
Swedish
Hungarian

The second Zap Refersh transceiver will have the following languages:

English
Russian
Lithuanian
Polish
Czech
Slovakian
Croatian
Romanian
Slovenia
Latvian
Estonian
Ukraine
Servian
Bulgarian

Key Hardware Requirements:

Define Key Hardware Requirements. Insert drawings, photos, or other representation if required, after table.

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Tracking Number	Description	Status - First Launch	Status - Main Launch	Priority
Z-1	Vibrator (same as 8700)	Stage IV	Committed	1
Z-2	Vibrator grommet	Stage IV	Committed	1
Z-3	Painted housings & batt doors (flat)	Stage IV	Committed	1
Z-4	Improved keypad	Stage IV	Committed	1
Z-5	Tricoder	Stage V		2

Priority:

1=Must ship in stage IV launch on Sept 1

2=Must ship in stage V launch on Oct 1

Define Flex Requirements. This is the list of most important default flexing settings.

Insert drawings, photos, or other representation if required, after table.

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 2 columns wide.

Feature	Flex Default
Same as cd920 and cd930	

Insert Wake Up Graphic required:
Same as cd920 and cd930.

Define Menu Requirements.
Insert graphic detail for new quick access icons, after table.

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Quick Access

New Features

New Features

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 7 columns wide.

Phone
Book

Call Related
Features

Messages

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 7 columns wide.

Phone Setup

Network Selection

Call Meters

Accessory Setup

Define Box , Box Insert, and Overpack requirements. Identify if these are common existing designs, or new designs.
Insert or attach drawing, or photos, if available.
New box artwork will be required for Zap refresh stage IV due to product market name change.

Standard Box pack configuration.
Define standard model complement. Identify all components which go into this pack configuration.

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Configuration

Contents

Quantity

Comments

Same as cd920 and cd930 except a leather holster will replace the plastic holster for product with painted housings.

Extended Box pack configuration.
Define extended model complement, (more items than standard model complement).
Identify all components which will go into this pack configuration.

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Configuration

Contents

Quantity

Comments

Same as cd920/cd930.

Define Packaging, Manual and Label Artwork requirements. Identify which items require a unique artwork.
Insert or attach drawing, or photos, if available.
New artworks will be required for manuals, boxes, escutheons as necessary due to the market name change on stage IV.

Define any unique package Labeling required for this product. Include special requirements such as TIM Metricola numbers, etc.
Include all labels, including transceiver, packaging, accessories, etc.

Insert or attach drawing, or photos, if available.
TBA

EAN Numbers for each product type, for each market:
Define EAN Numbers:

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Market (Country)	Product Name	EAN Number	Comments
------------------	--------------	------------	----------

Define Current Accessories and Compatibility to this product:

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Model, Kit, or Part Number	Accessory Name	Compatibility Notes
----------------------------	----------------	---------------------

Same as cd920 and cd930

Define Planned Accessories and Compatibility to this product:

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 4 columns wide.

Model, Kit, or Part Number	Accessory Name	Compatibility Notes	Availability Date
----------------------------	----------------	---------------------	-------------------

Same as cd920 and cd930

Define Type Approval Requirements, such as GSM Phase 2, and other Approval Requirements, such as CE Compliance, E Mark Compliance, etc. Include compliance specification number definition where required.
Same as cd920 and cd930

Hot Spot to Assembly Number Assignment database. This Hot Spot for use by all personnel.
Click in Hot Spot, to view, or to generate a request for model, kit, or assembly numbers.

New Sales Models:

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Sales Model Number	Brand	Description
SE0007Cccxx	cd921	Stage IV Flipped Zap
SE0012Cccxx	cd921	Stage IV Flipped Zap w/ CPHS
SE0006Cccxx	cd931	Stage IV Flat Zap
SE0013Cccxx	cd931	Stage IV Flat Zap w/ CPHS
SE0007Dccxx	cd921	Stage V Flipped Zap
SE0012Dccxx	cd921	Stage V Flipped Zap w/ CPHS
SE0006Dccxx	cd931	Stage V Flat Zap
SE0013Dccxx	cd931	Stage V Flat Zap w/ CPHS

Note: For Europe, Zap refresh will utilize all the existing model numbers from the initial launch of Zap. Zap reresh will employ a similar up-suffixing scheme as stage I, II, III of Zap. Stage IV models will be upsuffixed to the 'C' version of Zap. Stage IV product will also have the market name change as per above. Stage V model numbers will be upsuffixed to 'D' version of Zap. Stage V will not have a market name change.

New Field Service Models:

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 3 columns wide.

Field Service Model Number	Brand	Description
TBA		

Define New Sales Model Content for the First Core Product. Include all model, kit, or item numbers:

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

Models	Transceiver	Manual	Accessories	Other
Stage IV: Flip Zap SE0005CB1xx SE0007CB1xx SE0012CB1xx	Kit: SUGxxxx - Blk SUGxxxx - Grey SUGxxxx - TP blue Rear Escutheon: See Table 2 in appendix	Kit: See Table 1 in section 4.4 Manual: See Table 1 in section 4.4 Literature Kit: See Table 3 in appendix	Battery: (LGQ8) SNN5360 Battery Door AAA: SHN6617-BLK SHN6825-Grey SHN6943-TP blue Universal Charger: SPN4278 Plug: See Table 1 in section 4.4	Holster (plastic): SHN6851 ZAP WINGS box: 56xxxxxKxx Blue pulp insert: 5603930K01 Flip escutheon: See Table 2 in appendix
Stage V: Flip Zap SE0005DB1xx SE0007DB1xx SE0012DB1xx	Kit: SUGxxxx - Blk SUGxxxx - Grey SUGxxxx - TP blue Rear Escutheon: See Table 2 in appendix	Kit: See Table 1 in section 4.4 Manual: See Table 1 in section 4.4 Literature Kit: See Table 3 in appendix	Battery: (LGQ8) SNN5360 Battery Door AAA: SHN6617-BLK SHN6825-Grey SHN6943-TP blue Universal Charger: SPN4278 Plug: See Table 1 in section 4.4	Holster (plastic): SHN6851 Zap WINGS box: 56xxxxxKxx Blue pulp insert: 5603930K01 Flip escutheon: See Table 2 in appendix
Stage IV: Flat Zap SE0006CB1xx SE0013CB1xx	Kit: SUGxxxx - Blk SUGxxxx - Grey SUGxxxx - TP blue Rear Escutheon: See Table 2 in appendix	Kit: See Table 1 in section 4.4 Manual: See Table 1 in section 4.4 Literature Kit: See Table 3 in appendix	Battery: (LGQ8) SNN5360 Battery Door AAA: SHN6617-BLK SHN6825-Grey SHN6943-TP blue Universal Charger: SPN4278 Plug: See Table 1 in section 4.4	Holster (plastic): SHN6851 ZAP WINGS box: 56xxxxxKxx Blue pulp insert: 5603930K01 Front escutheon: See Table 2 in appendix
Stage V: Flat Zap SE0006DCB1xx SE0013DB1xx	Kit: SUGxxxx - Blk SUGxxxx - Grey SUGxxxx - TP blue Rear Escutheon: See Table 2 in appendix	Kit: See Table 1 in section 4.4 Manual: See Table 1 in section 4.4 Literature Kit: See Table 3 in appendix	Battery: (LGQ8) SNN5360 Battery Door AAA: SHN6617-BLK SHN6825-Grey SHN6943-TP blue Universal Charger: SPN4278 Plug: See Table 1 in section 4.4	Holster (plastic): SHN6851 ZAP WINGS box: 56xxxxxKxx Blue pulp insert: 5603930K01 Front escutheon: See Table 2 in appendix

Define any upcoming variants required, beyond this core product introduction.
These programs will be separately defined, with their own product description, etc.:
TBA

Hot Spot to Assembly Number Assignment database.
Click in Hot Spot, to view, or to generate a request for model, kit, or assembly numbers.

Define Manual requirements, and any translation priorities for the various models. Attach "01R" documents if applicable.

Place cursor in [] below header. Go to menu, select Create -> Table. Select number of rows you require, by 5 columns wide.

ModelsManual Kit NumberManual Part NumberLanguage MarketTranslation Priority

Table 1. Chargers and Manuals								
Stage IV Flip ZAP	Stage IV Flat ZAP	Stage V Flip ZAP	Stage V Flat ZAP	Charger Plug	Manual Kit #	Manual P/N	Priority	Market or Language
SE0007CccA1 SE0012CccA1	SE0006CccA1 SE0013CccA1	SE0007DccA1 SE0012DccA1	SE0006DccA1 SE0013DccA1	SYN4655	SJN7598B	6809417A28	1	Danish
SE0007CccB1 SE0012CccB1	SE0006CccB1 SE0013CccB1	SE0007DccB1 SE0012DccB1	SE0006DccB1 SE0013DccB1	SYN6718	SJN7609B	6809417A29	1	English (UK)
SE0007CccC1	SE0006CccC1	SE0007DccC1	SE0006DccC1	SYN4655	SJN7599B	6809417A30	1	Finnish
SE0007CccD1	SE0006CccD1	SE0007DccD1	SE0006DccD1	SYN4655	SJN7602B	6809417A31	1	Dutch
SE0007CccE1 SE0012CccE1	SE0006CccE1 SE0013CccE1	SE0007DccE1 SE0012DccE1	SE0006DccE1 SE0013DccE1	SYN4655	SJN7604B	6809417A32	1	French
SE0007CccF1	SE0006CccF1	SE0007DccF1	SE0006DccF1	SYN4655	SJN7608B	6809417A33	1	German
SE0007CccG1	SE0006CccG1	SE0007DccG1	SE0006DccG1	SYN4655	SJN7600B	6809417A34	1	Greek
SE0007CccH1	SE0006CccH1	SE0007DccH1	SE0006DccH1	SYN4655	SJN7607B	6809417A35	1	Italian
SE0007CccJ1	SE0006CccJ1	SE0007DccJ1	SE0006DccJ1	SYN4655	SJN7597B	6809417A36	1	Norwegian
SE0007CccK1	SE0006CccK1	SE0007DccK1	SE0006DccK1	SYN4655	SJN7601B	6809417A37	1	Portuguese
SE0007CccL1	SE0006CccL1	SE0007DccL1	SE0006DccL1	SYN4655	SJN7603B	6809417A38	1	Spanish
SE0007CccM1	SE0006CccM1	SE0007DccM1	SE0006DccM1	SYN4655	SJN7606B	6809417A39	1	Swedish
SE0007CccN1	SE0006CccN1	SE0007DccN1	SE0006DccN1	SYN4655	SJN7602B	6809417A40	1	Belgium
SE0007CccP1	SE0006CccP1	SE0007DccP1	SE0006DccP1	SYN4655	SJN7604B,	6809417A41	1	Swiss Package
SE0007CccQ1	SE0006CccQ1	SE0007DccQ1	SE0006DccQ1	SYN4655	SJN7595B	6809417A39	1	Turkish
SE0007CccR1	SE0006CccR1	SE0007DccR1	SE0006DccR1	SYN4655	SJN7596B	6809417A43	1	Hungarian
SE0007CccS1	SE0006CccS1	SE0007DccS1	SE0006DccS1	SYN4655	SJN7572B	6809417A44	1	Slovakian
other models	other models	other models	other models	SYN4655	SJN7610B	6809417A45	1	Arabic
SE0007CccT1	SE0006CccT1	SE0007DccT1	SE0006DccT1	n/a	SJN7604B	6809417A46	1	North Africa
SE0007CccU1	SE0006CccU1	SE0007DccU1	SE0006DccU1	SYN4655	SJN7593B	6809417A47	1	Russian
SE0007CccV1	SE0006CccV1	SE0007DccV1	SE0006DccV1	SYN4655	SJN7592B	6809417A48	1	Lithuanian
SE0007CccW1	SE0006CccW1	SE0007DccW1	SE0006DccW1	SYN4655	SJN7571B	6809417A49	1	Polish
SE0007CccY1	SE0006CccY1	SE0007DccY1	SE0006DccY1	SYN4655	SJN7793B	6809417A50	1	Czech
SE0007CccZ1	SE0006CccZ1	SE0007DccZ1	SE0006DccZ1	SYN4655	None	None	1	No language
SE0007CccB2	SE0006CccB2	SE0007DccB2	SE0006DccB2	SYN4655	SJN7609B	6809417A51	1	English for S.
SE0007CccC2	SE0006CccC2	SE0007DccC2	SE0006DccC2	SYN4655	SJN8173B	6809417A52	1	Croatian
SE0007CccF2	SE0006CccF2	SE0007DccF2	SE0006DccF2	SYN4655	SJN7608B	6809417A53	1	German for
SE0007CccG2	SE0006CccG2	SE0007DccG2	SE0006DccG2	SYN6718	SJN7600B	6809417A54	1	Cyprus
SE0007CccP2	SE0006CccP2	SE0007DccP2	SE0006DccP2	SYN4655	SJN8174B	6809417A55	1	Romanian
SE0007CccS2	SE0006CccS2	SE0007DccS2	SE0006DccS2	SYN4655	SJN8175B	6809417A56	1	Slovenian
SE0007CccT2	SE0006CccT2	SE0007DccT2	SE0006DccT2	SYN6718	SJN7609B	-	1	Gulf States
SE0007CccU2	SE0006CccU2	SE0007DccU2	SE0006DccU2	SYN4655	SJN8176B	6809417A57	1	Ukrainian
SE0007CccX2	SE0006CccX2	SE0007DccX2	SE0006DccX2	SYN4655	SJN8180B	6809417A58	1	Israeli
SE0007CccZ2	SE0006CccZ2	SE0007DccZ2	SE0006DccZ2	SYN6718	None	None	1	No language
SE0007CccA3	SE0006CccA3	SE0007DccA3	SE0006DccA3	SYN4655	SJN8177B	6809417A59	1	Latvian
SE0007CccC3	SE0006CccC3	SE0007DccC3	SE0006DccC3	SYN4655	SJN8178B	6809417A60	1	Estonian
SE0007CccA4	SE0006CccA4	SE0007DccA4	SE0006DccA4	SYN4655	SJN8179B	6809417A61	1	Bulgarian
SE0007Cccxx	SE0006Cccxx	SE0007Dccxx	SE0006Dccxx	SYNxxxx	SJN8530A	6809417A62	1	Serbian

Priority:
1 = required at launch

Define Core Schedule Milestone Requirements:

Attach any additional information required:

Table 2:

Stages IV and V: Flipped	Black	Magix Grey	Ten Pin Blue
Lens Surround	Black	Silver MM524	Black
Lens Printing	Pantone 427	Bright White	Pantone 427
Front Escutcheon Part Number	54-09397-Mxx	54-09397-Mxx	54-09397-Mxx
Front Escutcheon Background	Black	Silver MM524	Black
Front Escutcheon Finish	Polished	Polished	Polished
Front Escutcheon Printing	Pantone 427	Bright White	Pantone 427
Back Escutcheon Part Number	54 09158-T04	54 09158-T04	54 09158-T04
Back Escutcheon Background	Black	Black	Black
Back Escutcheon Finish	Domed	Domed	Domed
Back Escutcheon Printing	Pantone 427	Pantone 427	Pantone 427
Keypad Background	Black	Black	Black
Keypad Finish	Hard	Hard	Hard

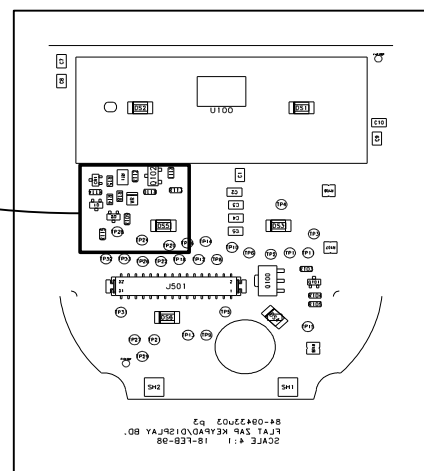
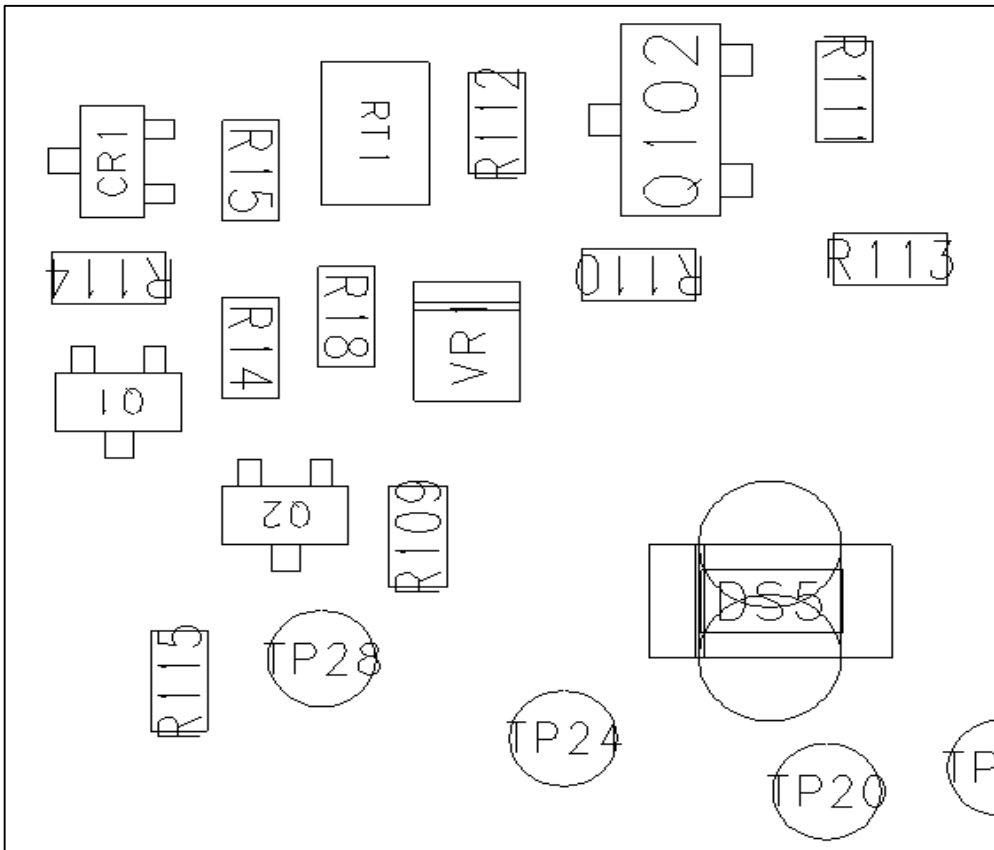
Stage IV & V: Flipless	Black	Magix Grey	Ten Pin Blue
Lens Surround	Black	Silver MM524	Black
Lens Printing	Pantone 427	Bright White	Pantone 427
Front Escutcheon Part Number	13-09432-Uxx	13-09432-Uxx	13-09432-Uxx
Front Escutcheon Background	Black	Silver MM524	Black
Front Escutcheon Finish	as body	as body	as body
Front Escutcheon Printing	Pantone 427	Bright White	Pantone 427
Back Escutcheon Part Number	54 09158-T04	54 09158-T04	54 09158-T04
Back Escutcheon Background	Black	Black	Black
Back Escutcheon Finish	Domed	Domed	Domed
Back Escutcheon Printing	Pantone 427	Pantone 427	Pantone 427
Keypad Background	Black	Black	Black
Keypad Finish	Silicon	Silicon	Silicon

Table 3: Literature Kits

Stage IV Flipped ZAP	Stage IV Flat ZAP	Stage V Flipped ZAP	Stage V Flipless ZAP	Kit Number	Market	Kit Contents
SE0007CccA1 SE0012CccA1	SE0006CccA1 SE0013CccA1	SE0007DccA1 SE0012DccA1	SE0006DccA1 SE0013DccA1	SJN8356BA	Denmark	Accessory leaflet-68p09414A66
SE0007CccB1 SE0012CccB1	SE0006CccB1 SE0013CccB1	SE0007DccB1 SE0012DccB1	SE0006DccB1 SE0013DccB1	SJN8356BB	UK	Accessory leaflet-68p09414A67 Registration Card-68p09408A20
SE0007CccC1 SE0007CccD1	SE0006CccC1 SE0006CccD1	SE0007DccC1 SE0007DccD1	SE0006DccC1 SE0006DccD1	SJN8356BC SJN8356BD	Finland Netherlands	Accessory leaflet-68p09414A68 Accessory leaflet-68p09414A69 Registration Card-68p09408A24
SE0007CccE1 SE0012CccE1	SE0006CccE1 SE0013CccE1	SE0007DccE1 SE0012DccE1	SE0006DccE1 SE0013DccE1	SJN8356BE	France	Accessory leaflet-68p09414A70 Registration Card-68p09408A21
SE0007CccF1	SE0006CccF1	SE0007DccF1	SE0006DccF1	SJN8356BF	Germany	Accessory leaflet-68p09414A71 Registration Card-68p09408A22 24 hour service-68p09405A07
SE0007CccG1	SE0006CccG1	SE0007DccG1	SE0006DccG1	SJN8356BG	Greece	Accessory leaflet-68p09414A72
SE0007CccH1	SE0006CccH1	SE0007DccH1	SE0006DccH1	SJN8356BH	Italy	Accessory leaflet-68p09414A73
SE0007CccJ1	SE0006CccJ1	SE0007DccJ1	SE0006DccJ1	SJN8356BJ	Norway	Accessory leaflet-68p09414A74
SE0007CccK1	SE0006CccK1	SE0007DccK1	SE0006DccK1	SJN8356BK	Portugal	Accessory leaflet-68p09414A75 Waranty Card-68p09405A09
SE0007CccL1	SE0006CccL1	SE0007DccL1	SE0006DccL1	SJN8356BL	Spain	Accessory leaflet-68p09414A76 Registration Card-68p09408A23 Waranty Card-68p09405A08
SE0007CccM1	SE0006CccM1	SE0007DccM1	SE0006DccM1	SJN8356BM	Sweden	Accessory leaflet-68p09414A77
SE0007CccN1	SE0006CccN1	SE0007DccN1	SE0006DccN1	SJN8356BN	Belgium	Accessory leaflet-68p09414A78
SE0007CccP1	SE0006CccP1	SE0007DccP1	SE0006DccP1	SJN8356BP	Switzerland	Accessory leaflet-68p09414A79
SE0007CccQ1	SE0006CccQ1	SE0007DccQ1	SE0006DccQ1	SJN8356BQ	Turkey	Accessory leaflet-68p09414A80
SE0007CccR1	SE0006CccR1	SE0007DccR1	SE0006DccR1	SJN8356BR	Hungary	Accessory leaflet-68p09414A81
SE0007CccS1	SE0006CccS1	SE0007DccS1	SE0006DccS1	SJN8356BS	Slovakia	Accessory leaflet-68p09414A82
other models	other models	other models	other models	SJN8356BT	Arab/Eng/French	Accessory leaflet-68p09414A83
SE0007CccT1	SE0006CccT1	SE0007DccT1	SE0006DccT1	SJN8356BT	North Africa	Accessory leaflet-68p09414A83
SE0007CccU1	SE0006CccU1	SE0007DccU1	SE0006DccU1	SJN8356BU	Russia	Accessory leaflet-68p09414A84
SE0007CccV1	SE0006CccV1	SE0007DccV1	SE0006DccV1	SJN8356BV	Lithuania	Accessory leaflet-68p09414A85
SE0007CccW	SE0006CccW1	SE0007DccW1	SE0006DccW1	SJN8356B	Poland	Accessory leaflet-68p09414A86
SE0007CccY1	SE0006CccY1	SE0007DccY1	SE0006DccY1	SJN8356BX	Czech Republic	Accessory leaflet-68p09414A87
SE0007CccZ1	SE0006CccZ1	SE0007DccZ1	SE0006DccZ1	NONE	Generic UK plug	None
SE0007CccB2	SE0006CccB2	SE0007DccB2	SE0006DccB2	SJN8491BA	So Africa	Accessory leaflet-68p09414A67
SE0007CccC2	SE0006CccC2	SE0007DccC2	SE0006DccC2	SJN8356BY	Croatia	Accessory leaflet-68p09414A88
SE0007CccF2	SE0006CccF2	SE0007DccF2	SE0006DccF2	SJN8489BA	Austria	Accessory leaflet-68p09414A71 Registration Card-68p09408A22 24 hour service-68p09405A16
SE0007CccG2	SE0006CccG2	SE0007DccG2	SE0006DccG2	SJN8356BZ	Cyprus	Accessory leaflet-68p09414A89
SE0007CccP2	SE0006CccP2	SE0007DccP2	SE0006DccP2	SJN8490BA	Romania	Accessory leaflet-68p09414A90
SE0007CccS2	SE0006CccS2	SE0007DccS2	SE0006DccS2	SJN8492BA	Slovenia	Accessory leaflet-68p09414A79
SE0007CccT2	SE0006CccT2	SE0007DccT2	SE0006DccT2	SJN8493BA	Gulf States	Accessory leaflet-68p09414A83
SE0007CccU2	SE0006CccU2	SE0007DccU2	SE0006DccU2	SJN8357BA	Ukraine	Accessory leaflet-68p09414A91
SE0007CccX2	SE0006CccX2	SE0007DccX2	SE0006DccX2	SJN8357BB	Israel	Accessory leaflet-68p09414A92
SE0007CccZ2	SE0006CccZ2	SE0007DccZ2	SE0006DccZ2	NONE	Generic UK plug	None
SE0007CccA3	SE0006CccA3	SE0007DccA3	SE0006DccA3	SJN8357BC	Latvia	Accessory leaflet-68p09414A93
SE0007CccC3	SE0006CccC3	SE0007DccC3	SE0006DccC3	SJN8357BD	Estonia	Accessory leaflet-68p09414A94
SE0007CccA4	SE0006CccA4	SE0007DccA4	SE0006DccA4	SJN8357BE	Bulgaria	Accessory leaflet-68p09414A95
SE0007Cccxx	SE0006Cccxx	SE0007Dccxx	SE0006Dccxx		Serbia	

Differences in parts placement - Flat Zap

Board#	0109036A75	0109036A74
Display	Samsung	Philips/ 3/5
PCB#	8409433U05 P5	8409433U05 P5
Ref#	P/N	P/N
R15	-	0660076P25
R14	0660076N93	0660076N79
R18	0660076P03	0660076N87
RT1	0611079B31	0613925A17
VR1	4809788E11	4809788E08 (nur 3/5)



**Europe, Middle East & Africa
Customer Services
Level 4 Authorised**

REVISIONS

Europe Middle East Afrika Customer Services

Level 4 Schematics

Dual Band ZAP

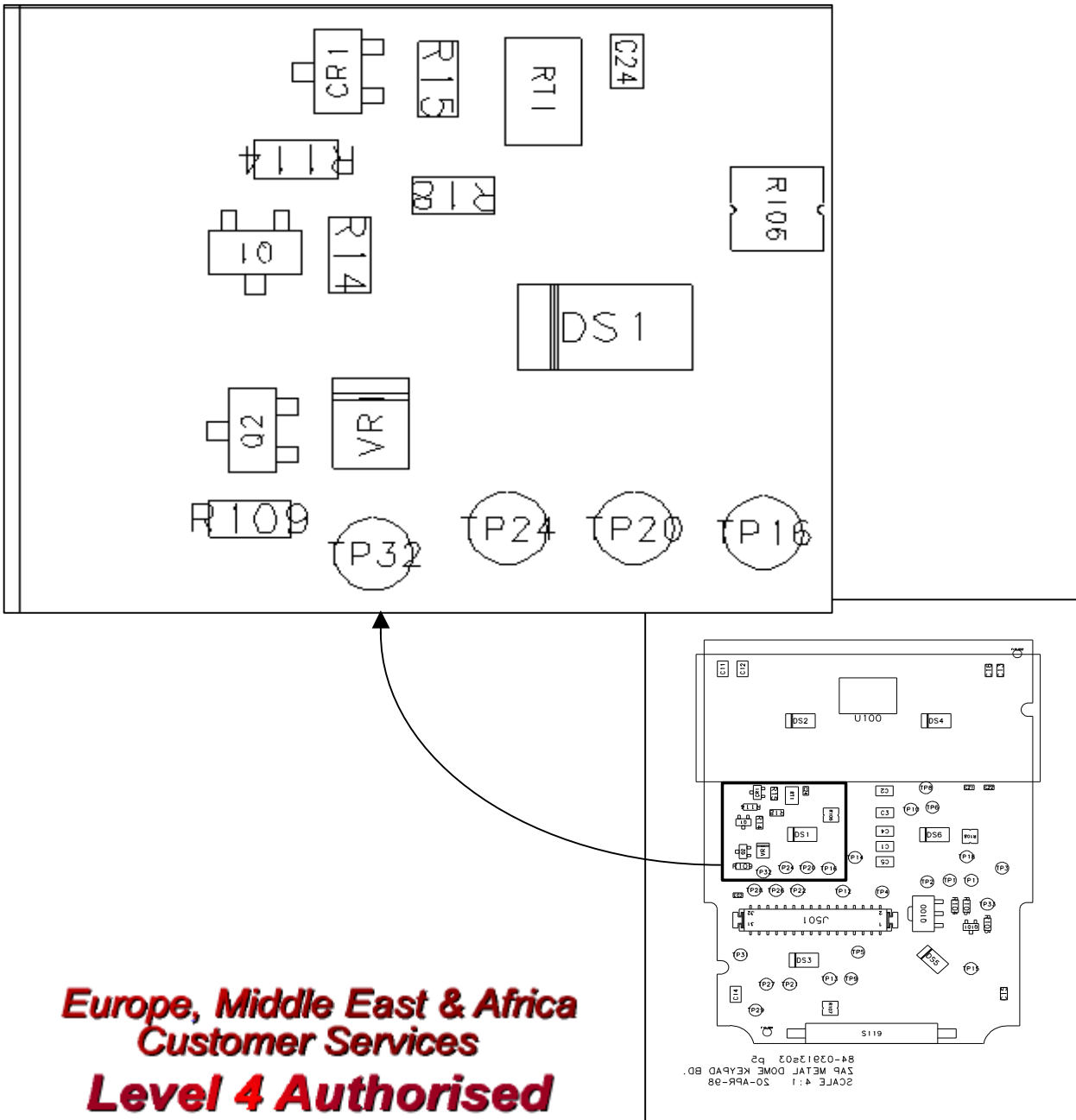
Colin Jack, Billy Jenkins, Michael Hansen, Ralf Lorenzen

13.08.98

Rev. 1.0

Keyboard differences in parts placement - Flip Zap

Board#	0109036A73	0109032A87
Display	Samsung	Philips/ 3/5
PCB#	8403913S03 R0	8403913S03 R0
Ref#	P/N	P/N
R15	-	0660076P25
R14	0660076N93	0660076N79
R18	0660076P03	0660076N87
RT1	0611079B31	0613925A17
VR1	4809788E11	4809788E08 (nur 3/5)



REVISIONS

Europe Middle East Afrika Customer Services

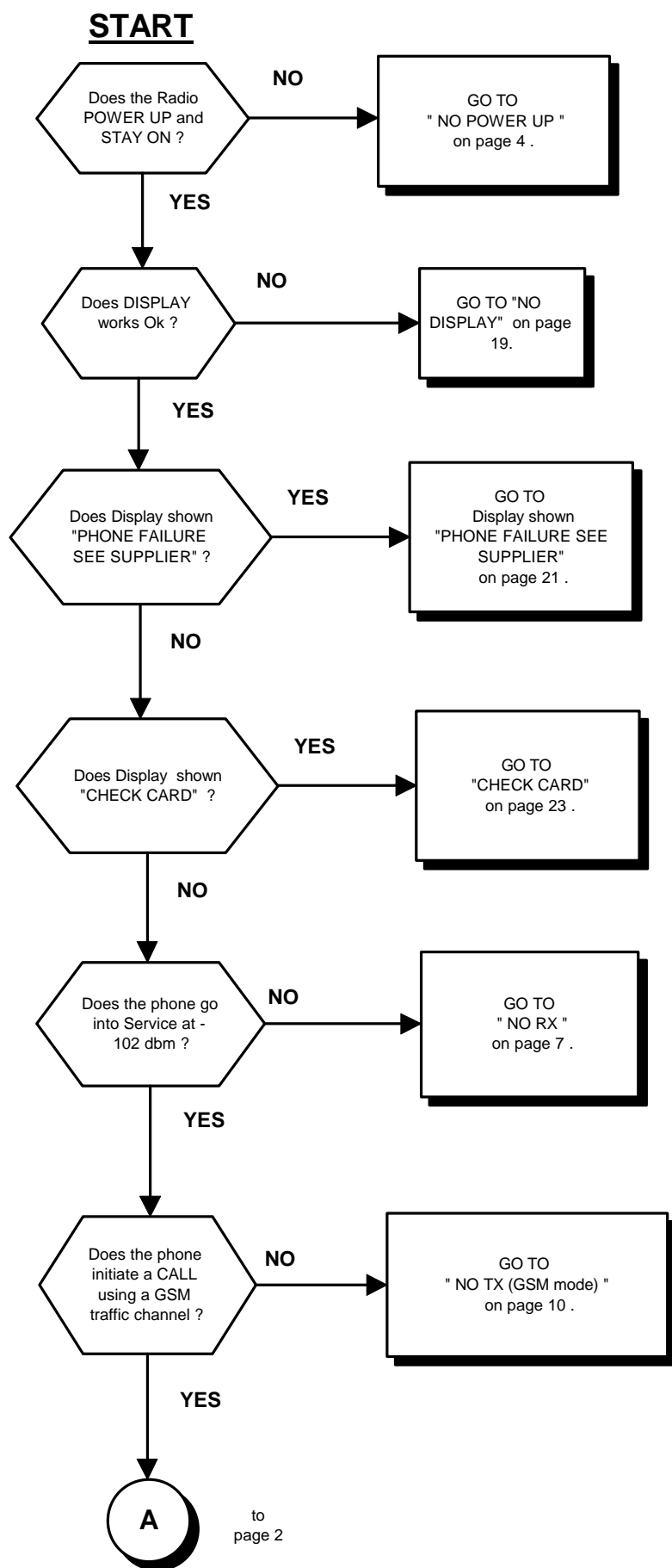
Level 4 Schematics

Dual Band ZAP

Colin Jack, Billy Jenkins, Michael Hansen, Ralf Lorenzen

13.08.98

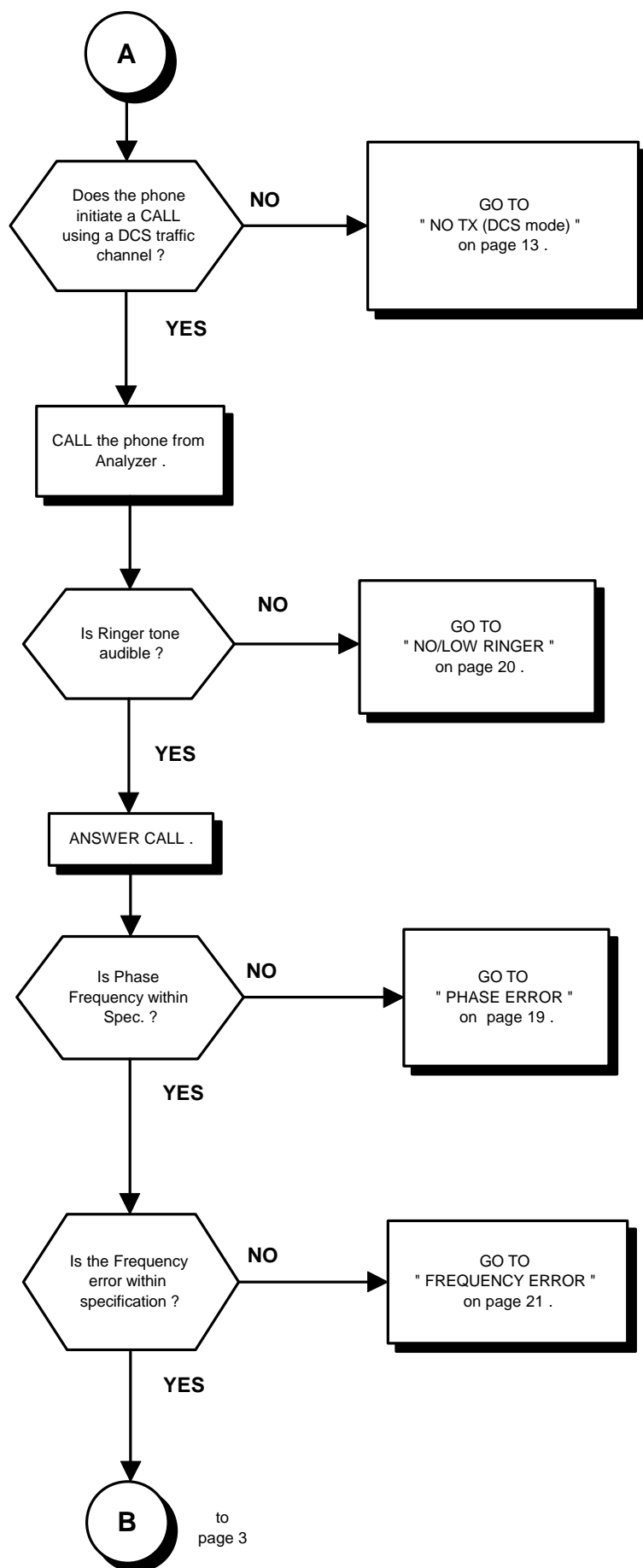
Rev. 1.0



**ZAP
TEST
SEQUENCE**

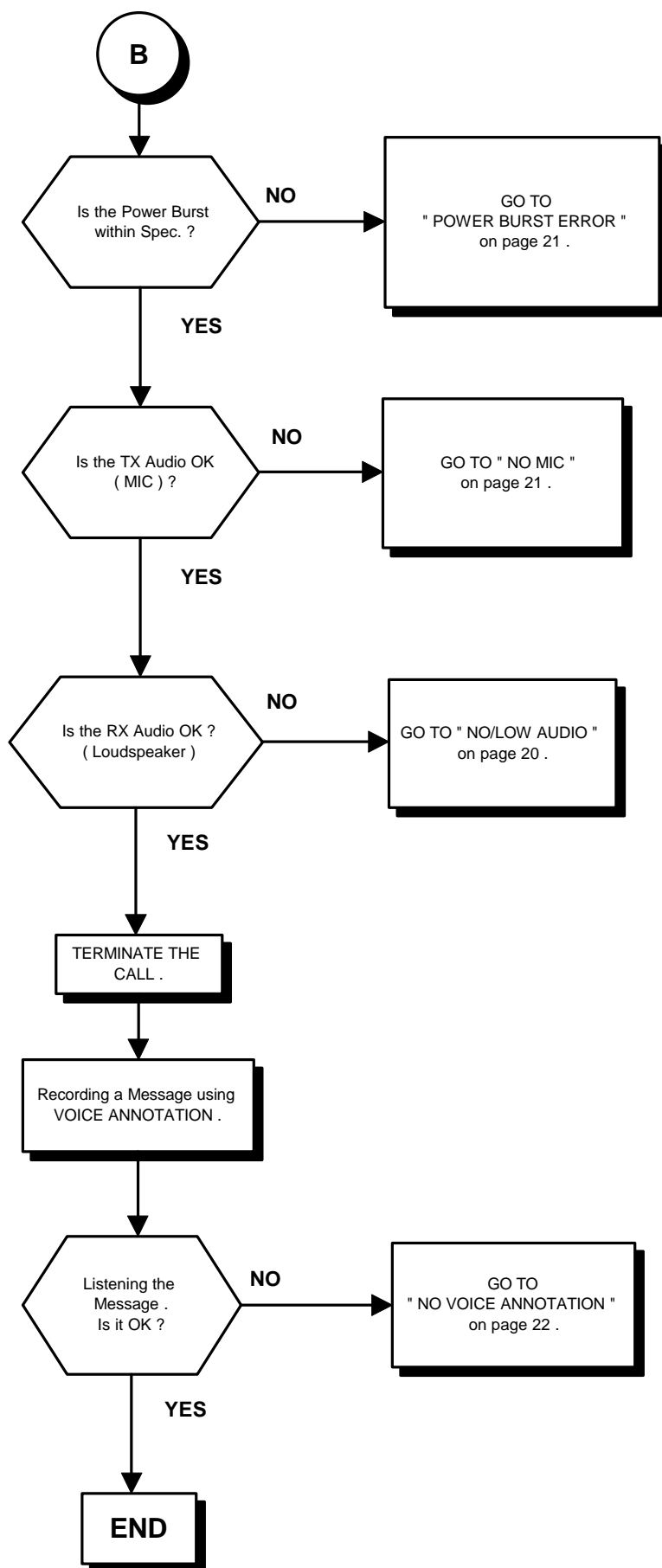


ZAP TEST SEQUENCE



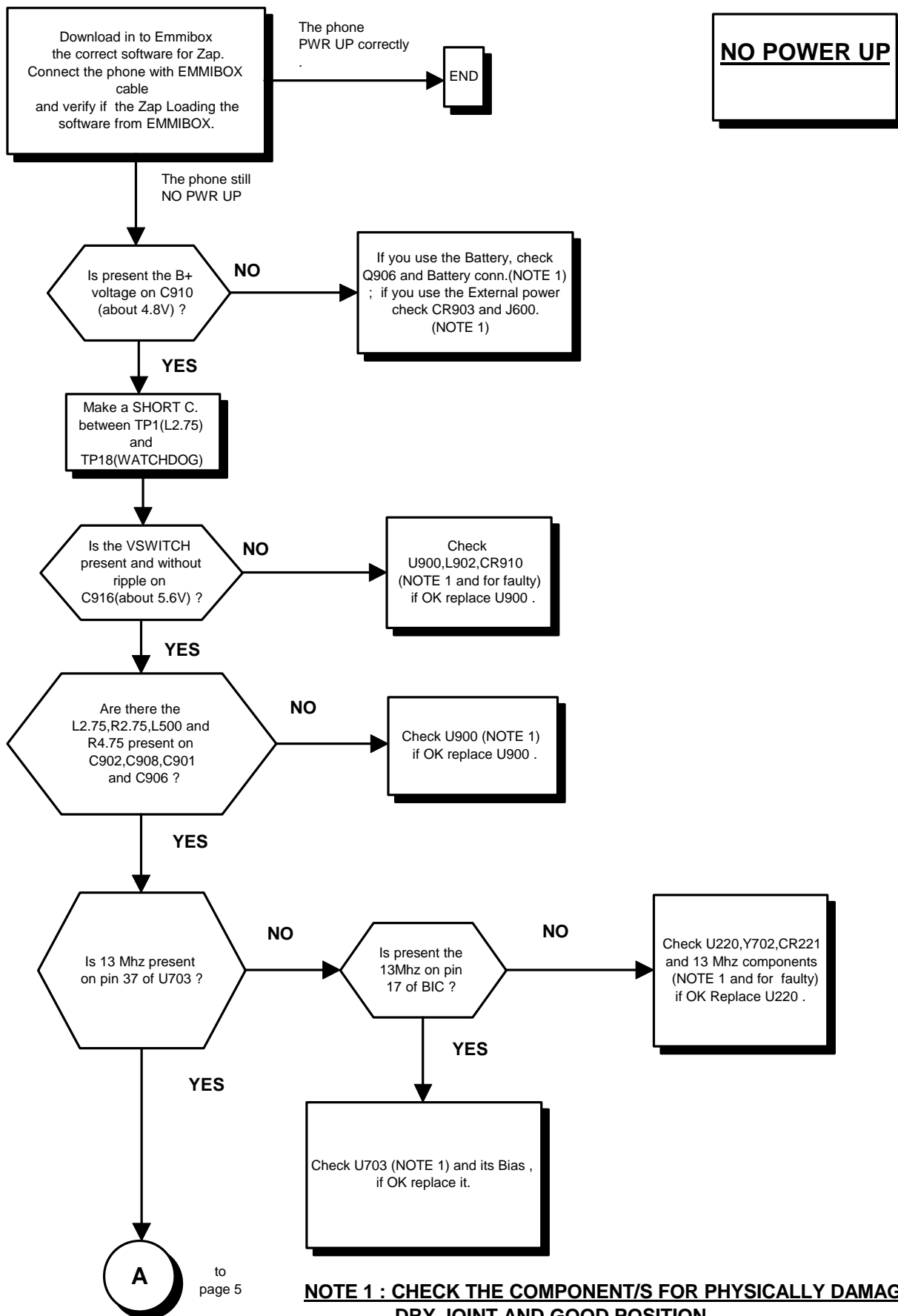


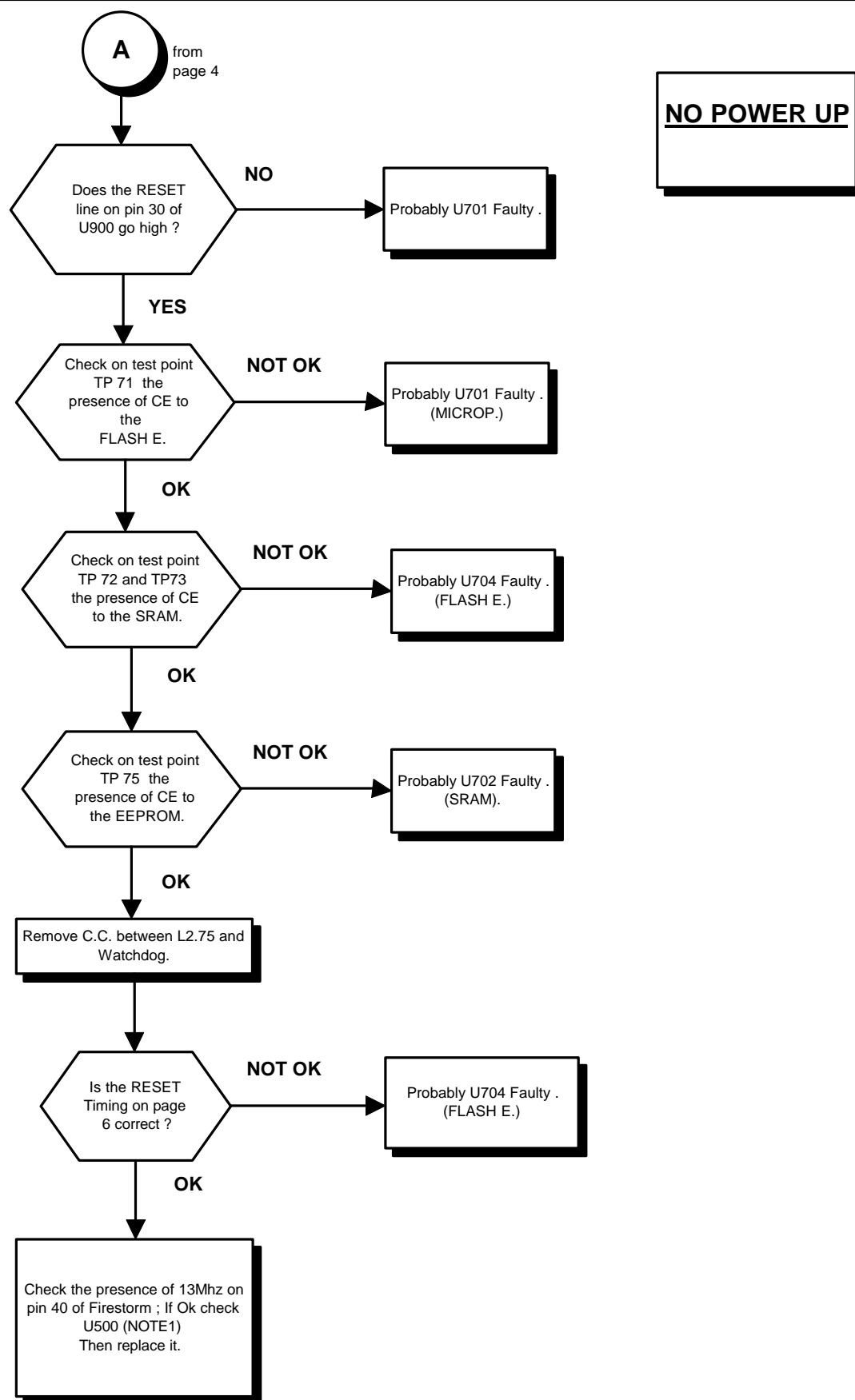
ZAP TEST SEQUENCE





START



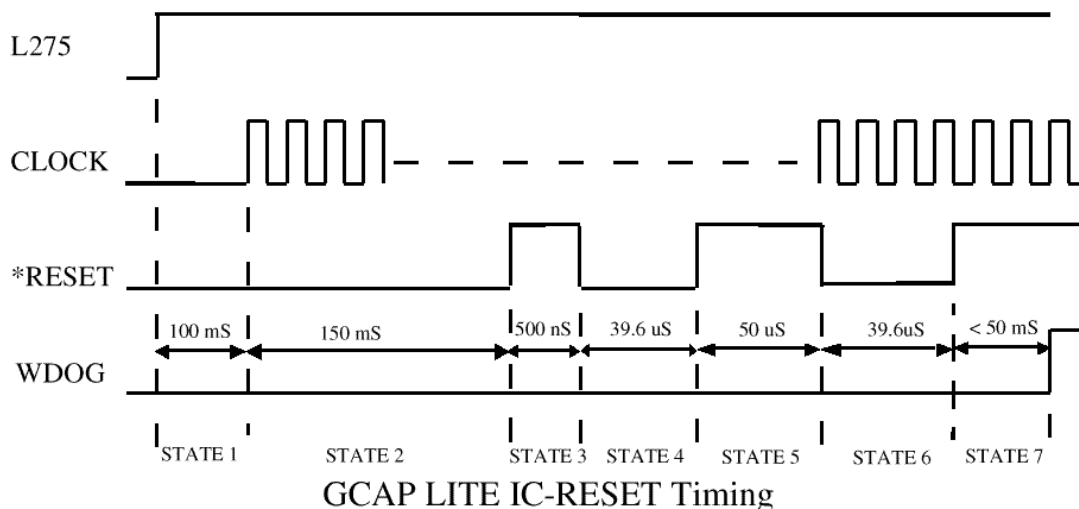


NOTE 1 : CHECK THE COMPONENT/S FOR PHYSICALLY DAMAGE DRY JOINT AND GOOD POSITION .



RESET SEQUENCE AT POWER ON

The power up RESET sequence is described in the following diagram. Following the activation of the +2.75V Regulator, the GCAP LITE IC and the 68338 begin a seven state power sequence involving the *RESET line and the GCAP Lite's Watchdog input. The figure below depicts the sequence of the states. The figure is not drawn to scale.



State 1

When the GCAP LITE IC detects a power on request (ON/OFF Linē LOW”), the GCAP LITE will drive the system *RESET line low. The 68338 Clock line will take approximately 100mS to stabilize after power is applied.

State 2

The 68338, SMOc, and BIC in the radio are connected to the *RESET line. The nominal time *RESET is held low by the GCAP LITE is 250 milliseconds +/- 50 ms.

State 3

When the GCAP LITE releases *RESET, it is pulled high by an internal resistor. There is a period of approximately 500 nanoseconds when neither the GCAP LITE or 68338 is asserting *RESET.

State 4

When the 68338 reset control logic detects that the system *RESET line is no longer being driven, it drives it low for an additional 512 cycles (39.6 microseconds). This assertion of *RESET by the 68338 is a feature of the IC and cannot be modified.

State 5

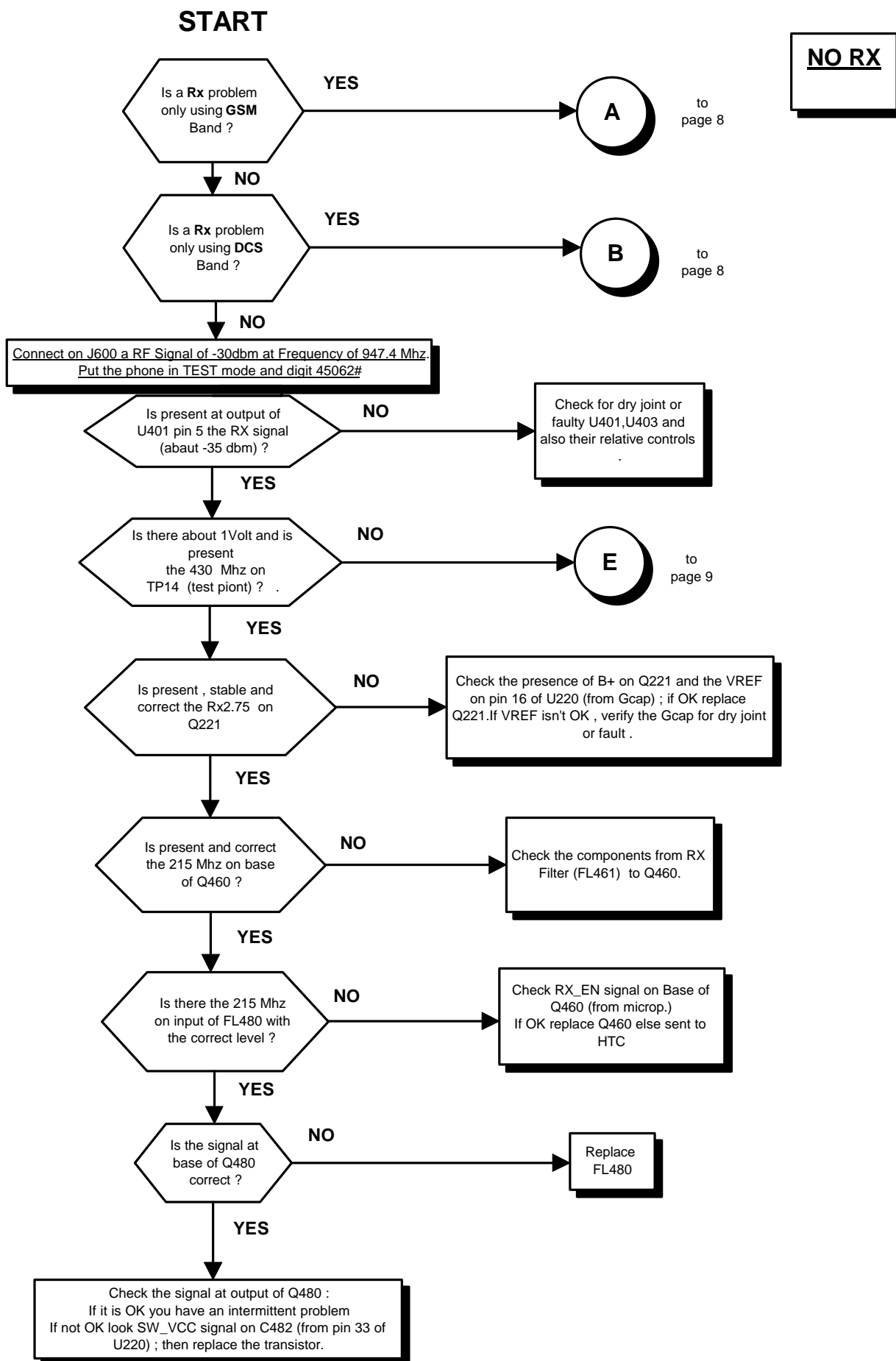
When the 68338 releases *RESET, it is pulled high by the internal resistor. The 68338 begins executing its Boot Code. If valid code is present, the RESET vector in the radio code is then executed. The Boot Code runs for about 512 cycles (39.6uS) before this new vector is executed.

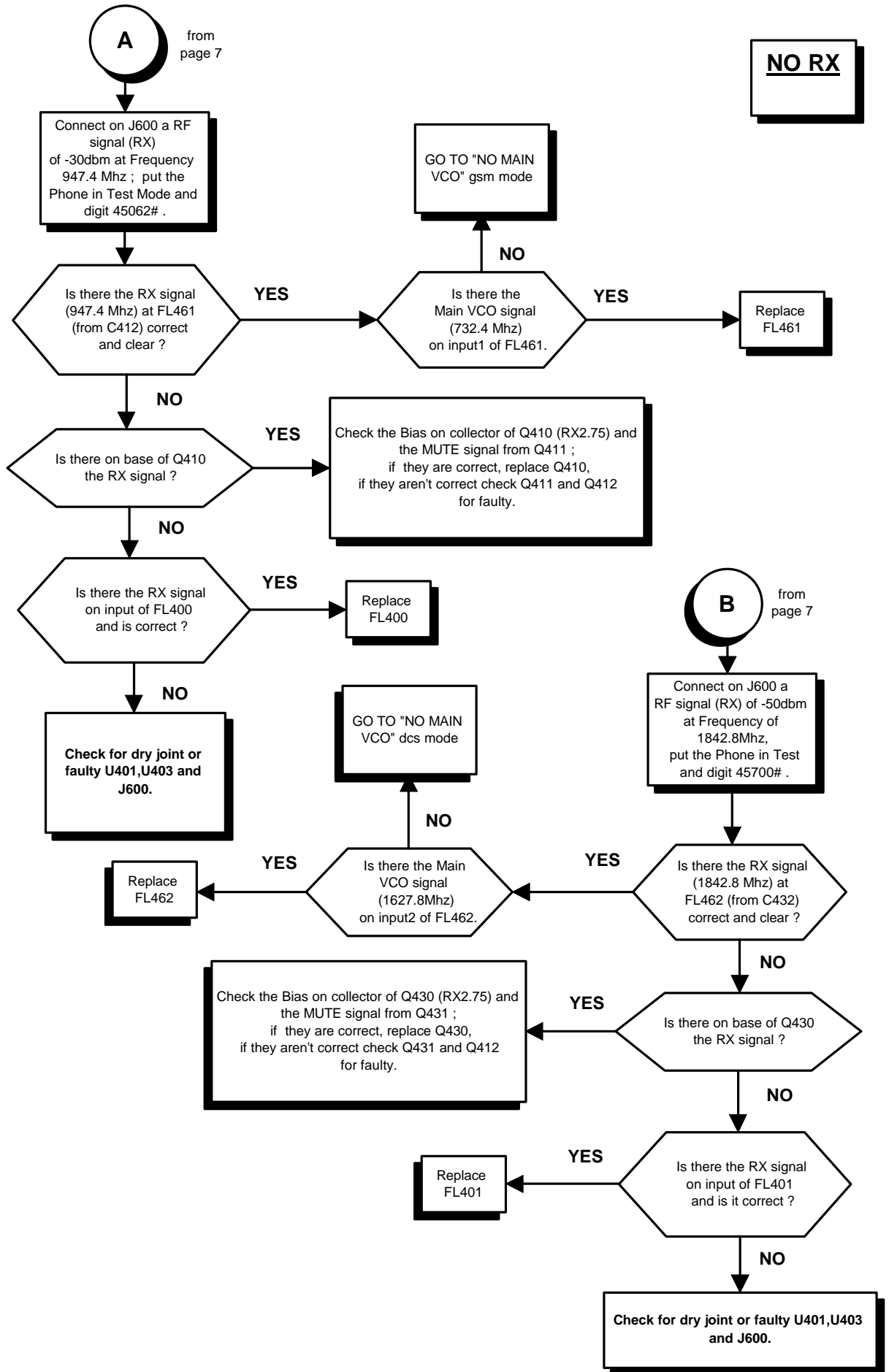
State 6

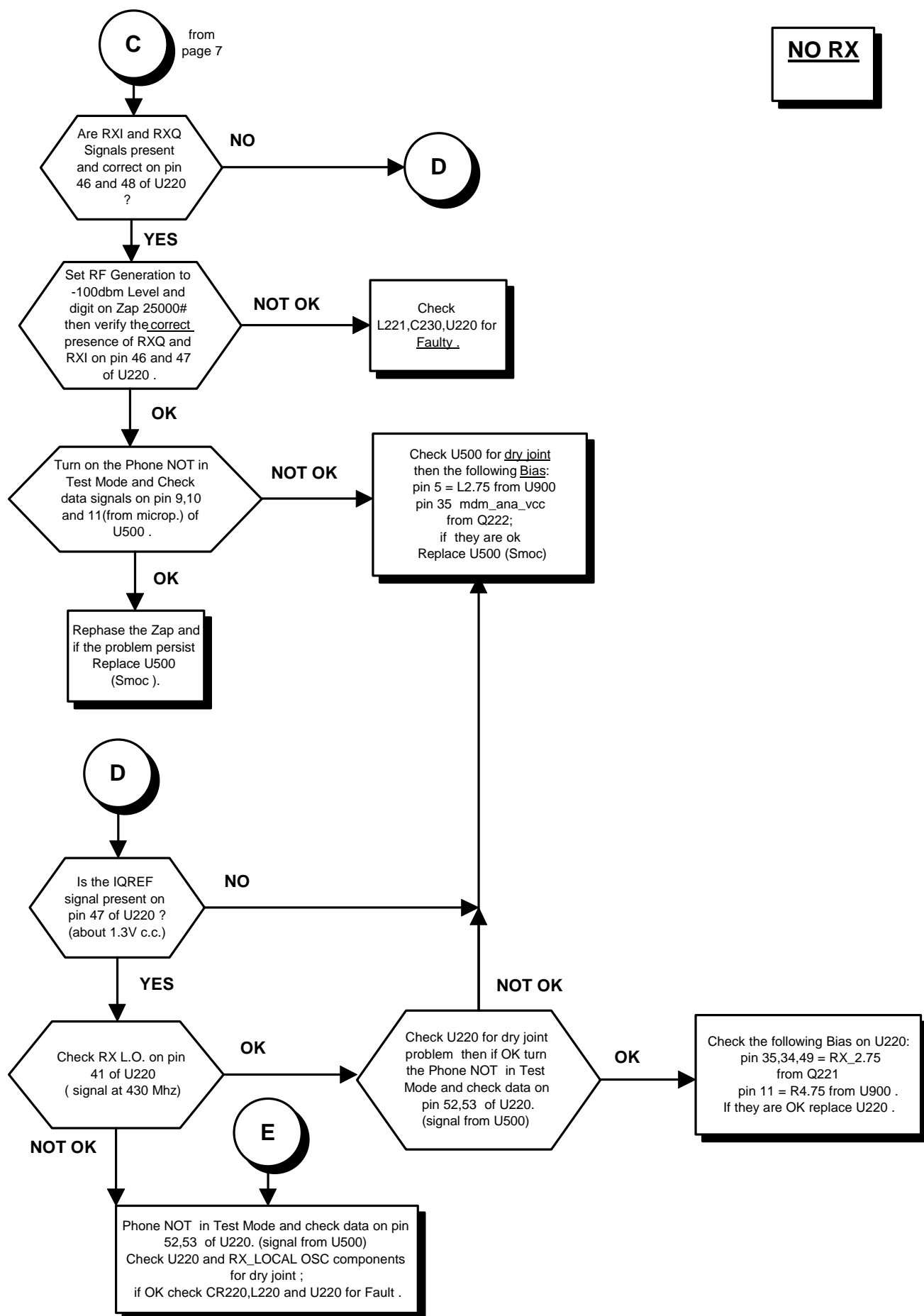
The 68338 holds *RESET low for 50uS during this state (an internally generated RE-SET).

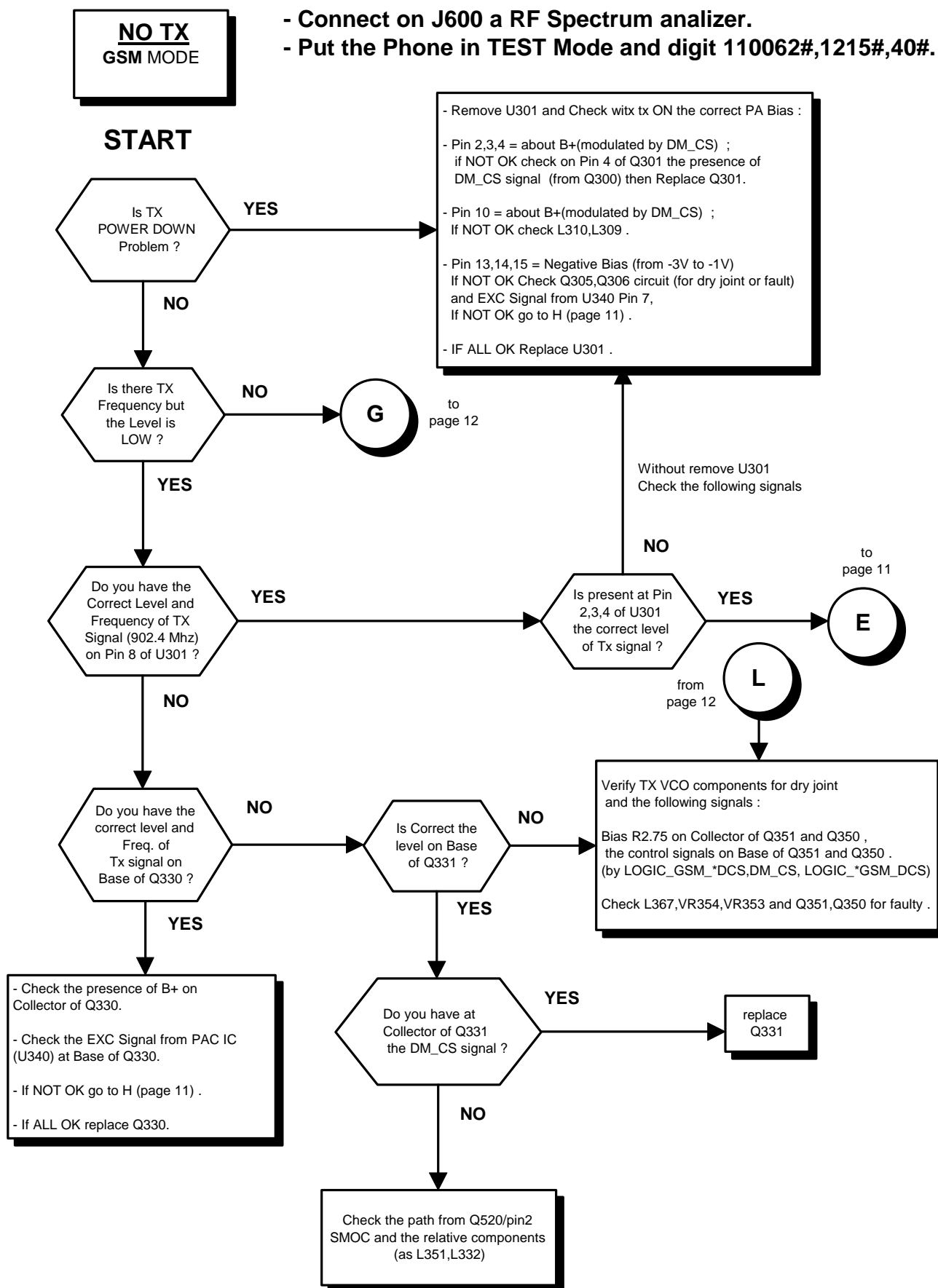
State 7

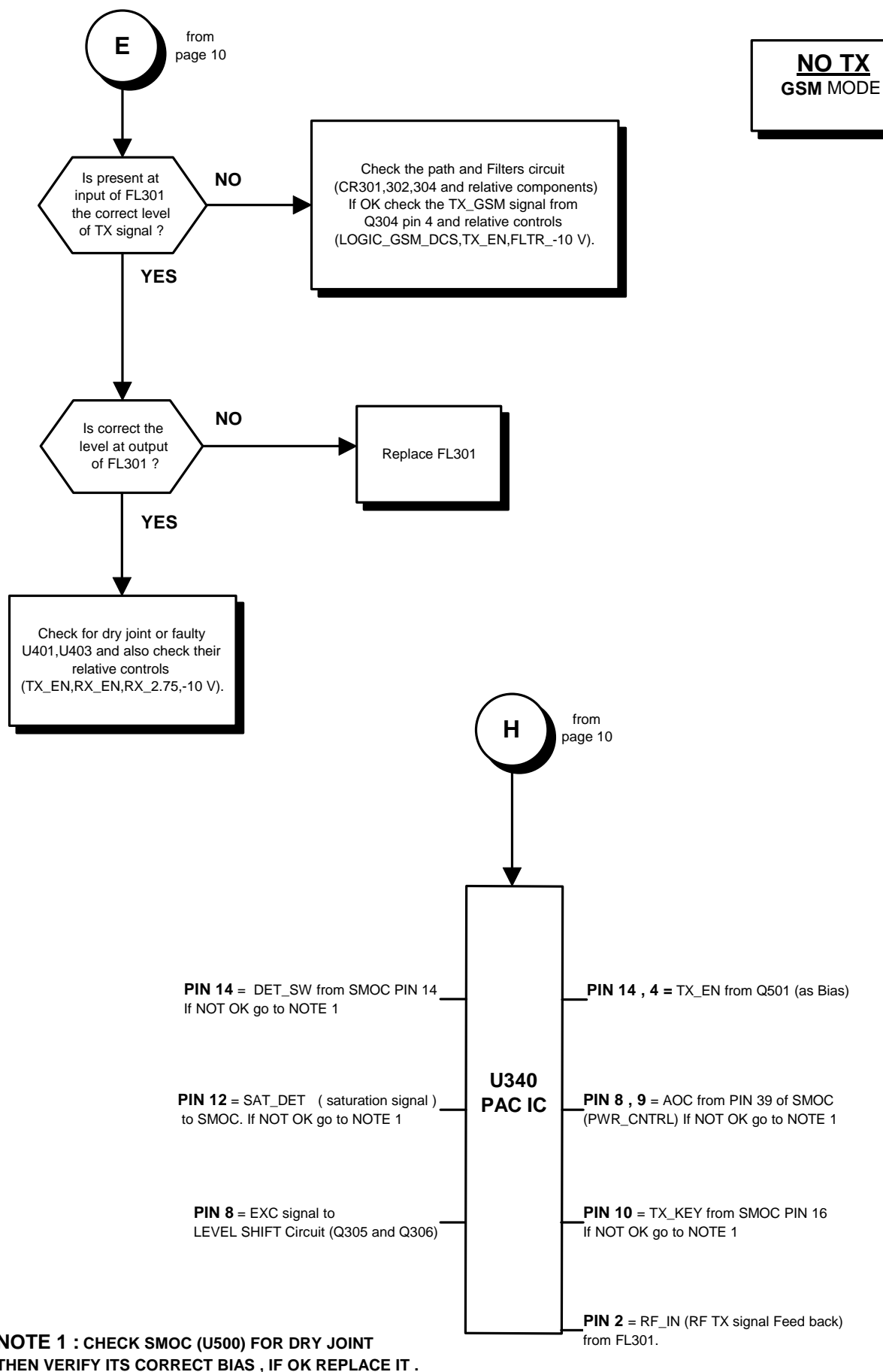
When the 68338 releases *RESET, it is again pulled high by the internal resistor. All the processors in the system, including the 68338, then begin execution. During this state, the 68338 must drive the GCAP Lite's Watchdog li

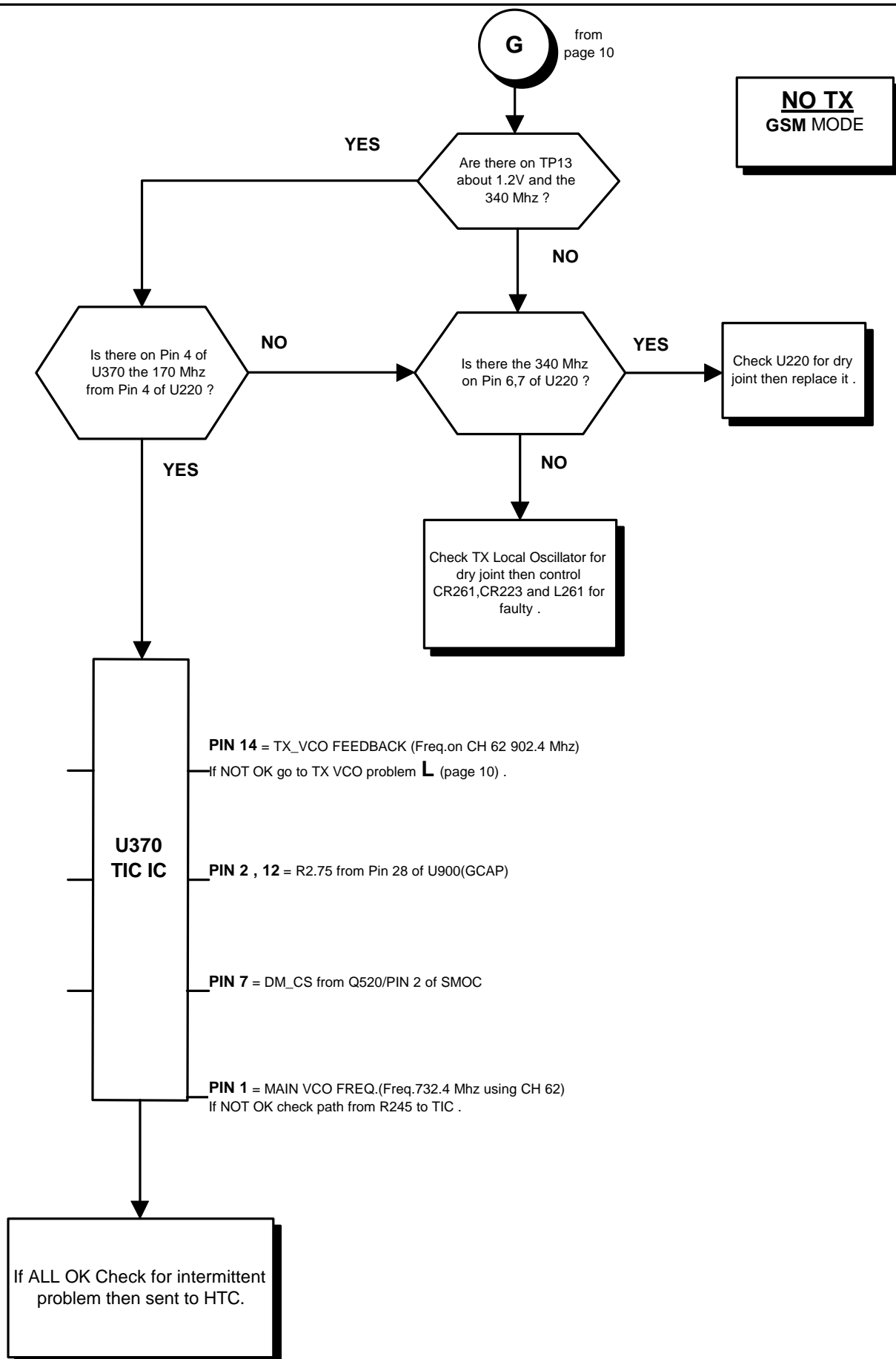








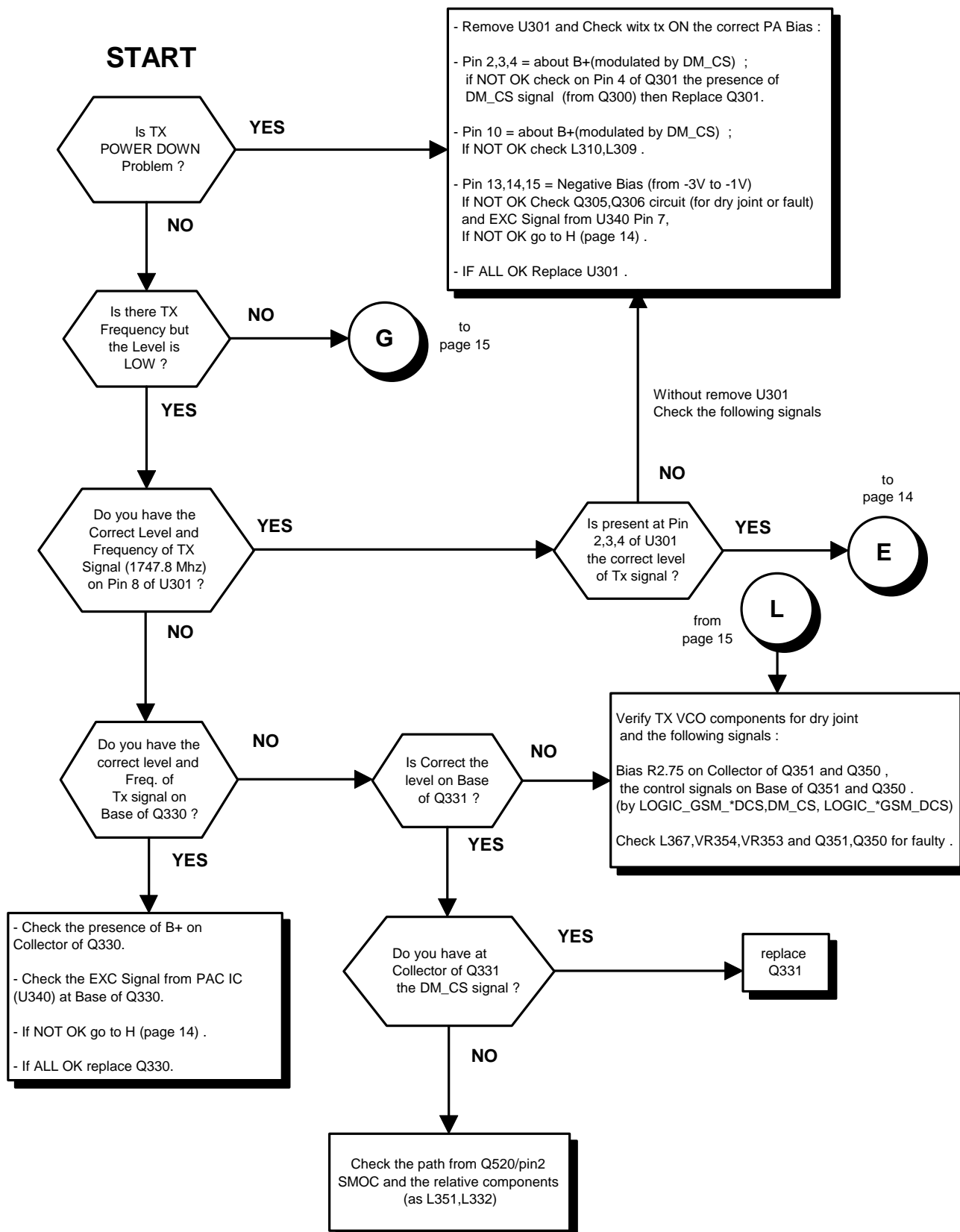


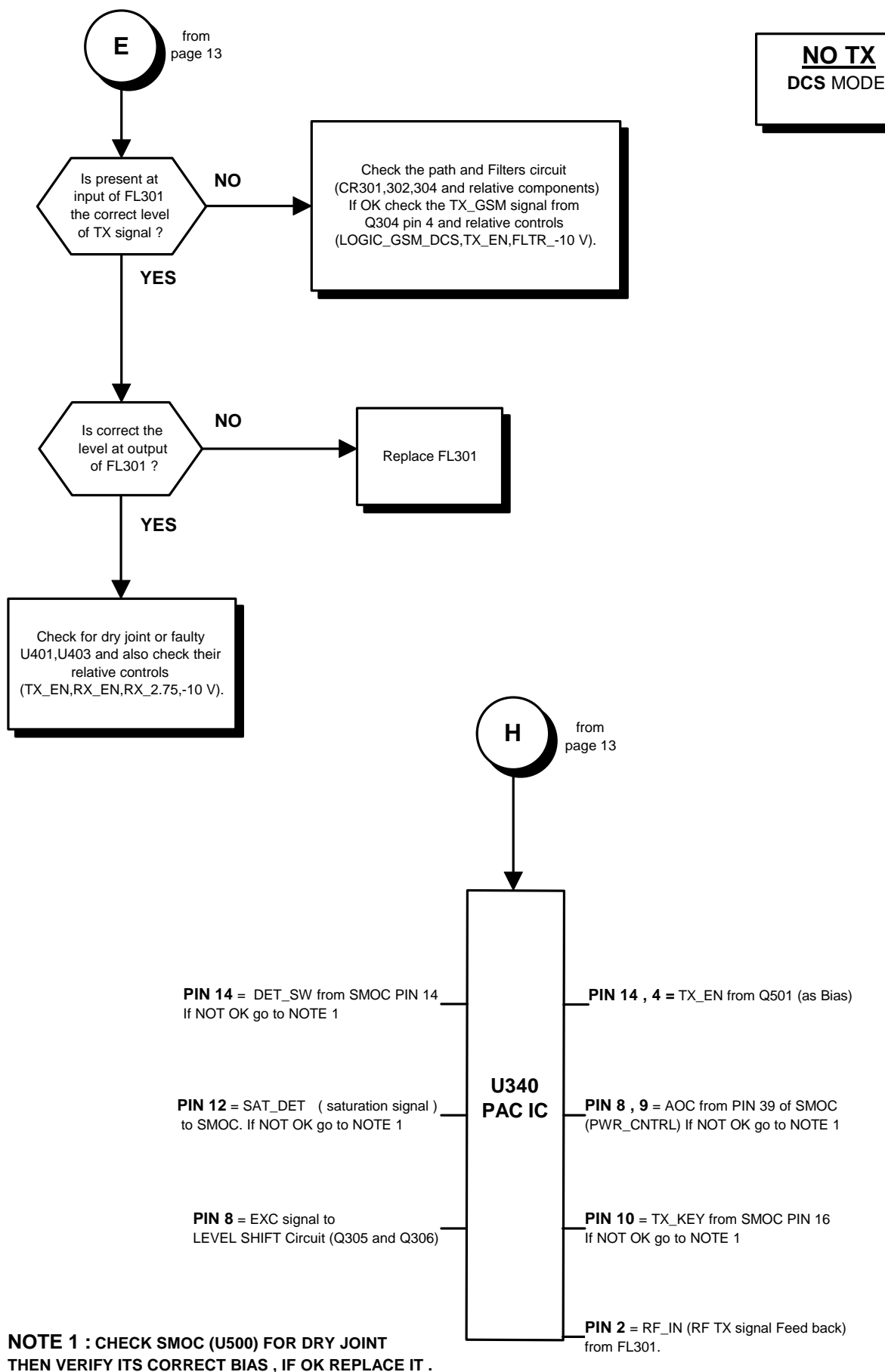


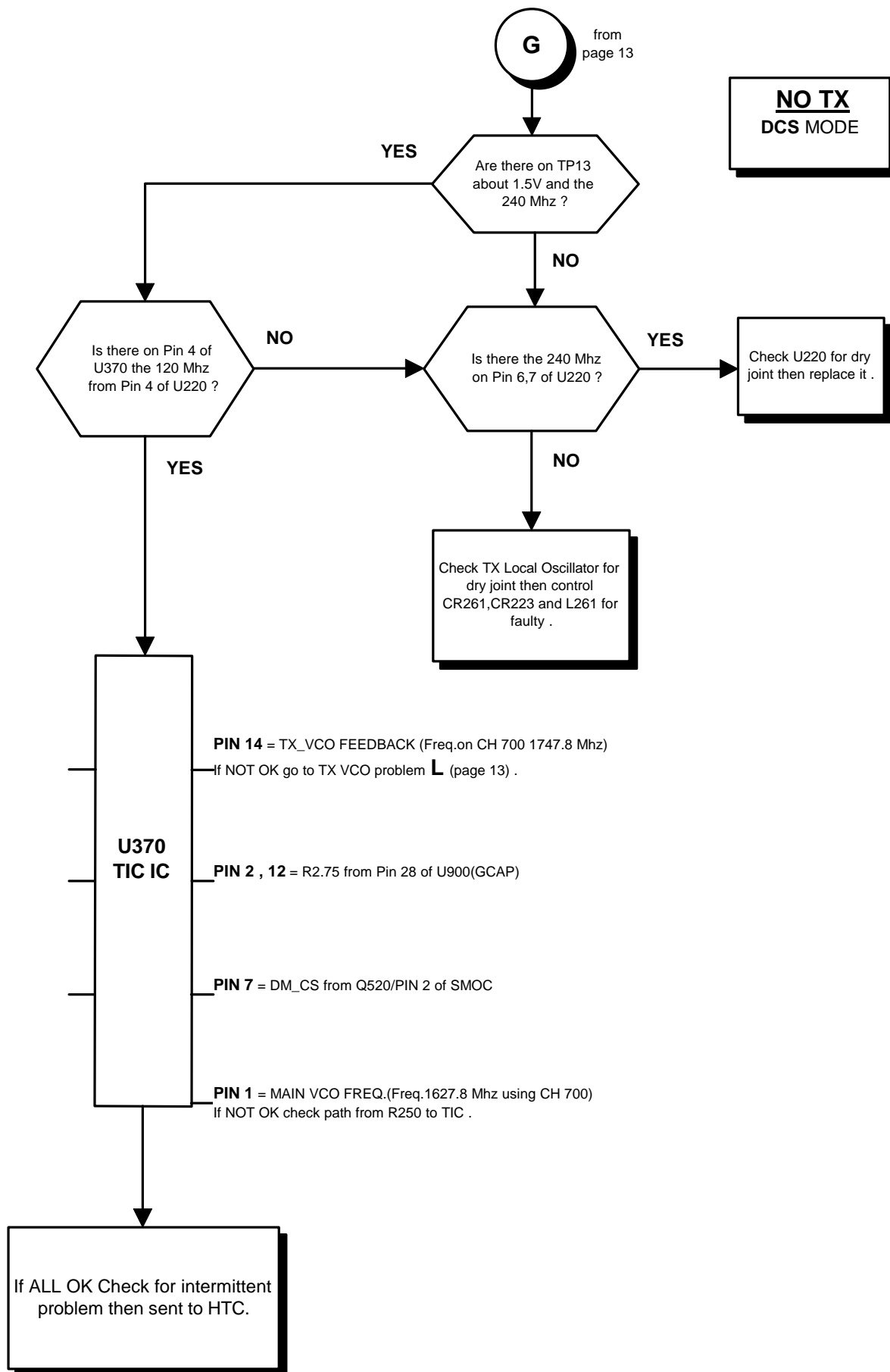


NO TX DCS MODE

- Connect on J600 a RF Spectrum analyzer.
- Put the Phone in TEST Mode and digit 110700#,1215#,40#.

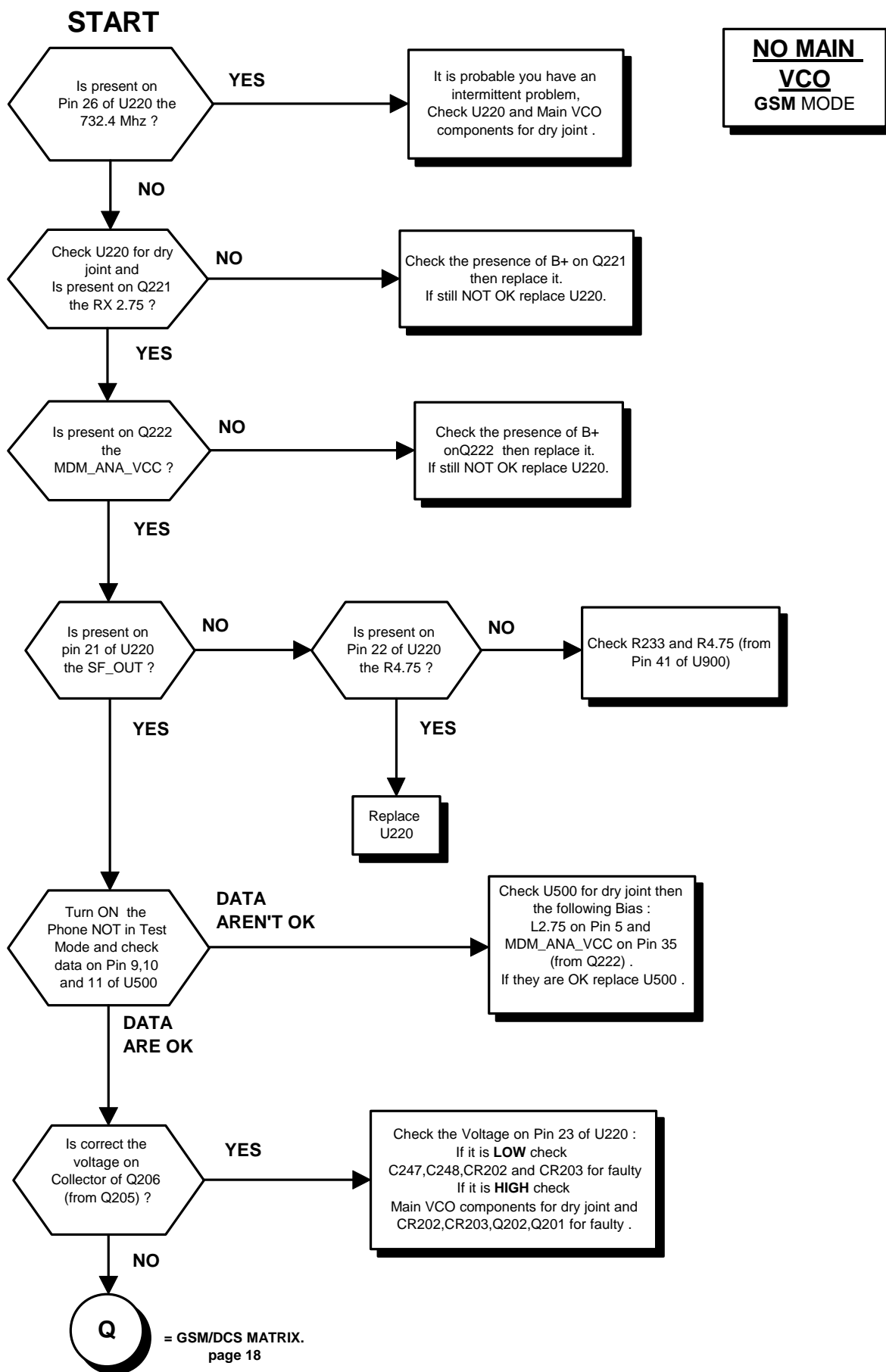






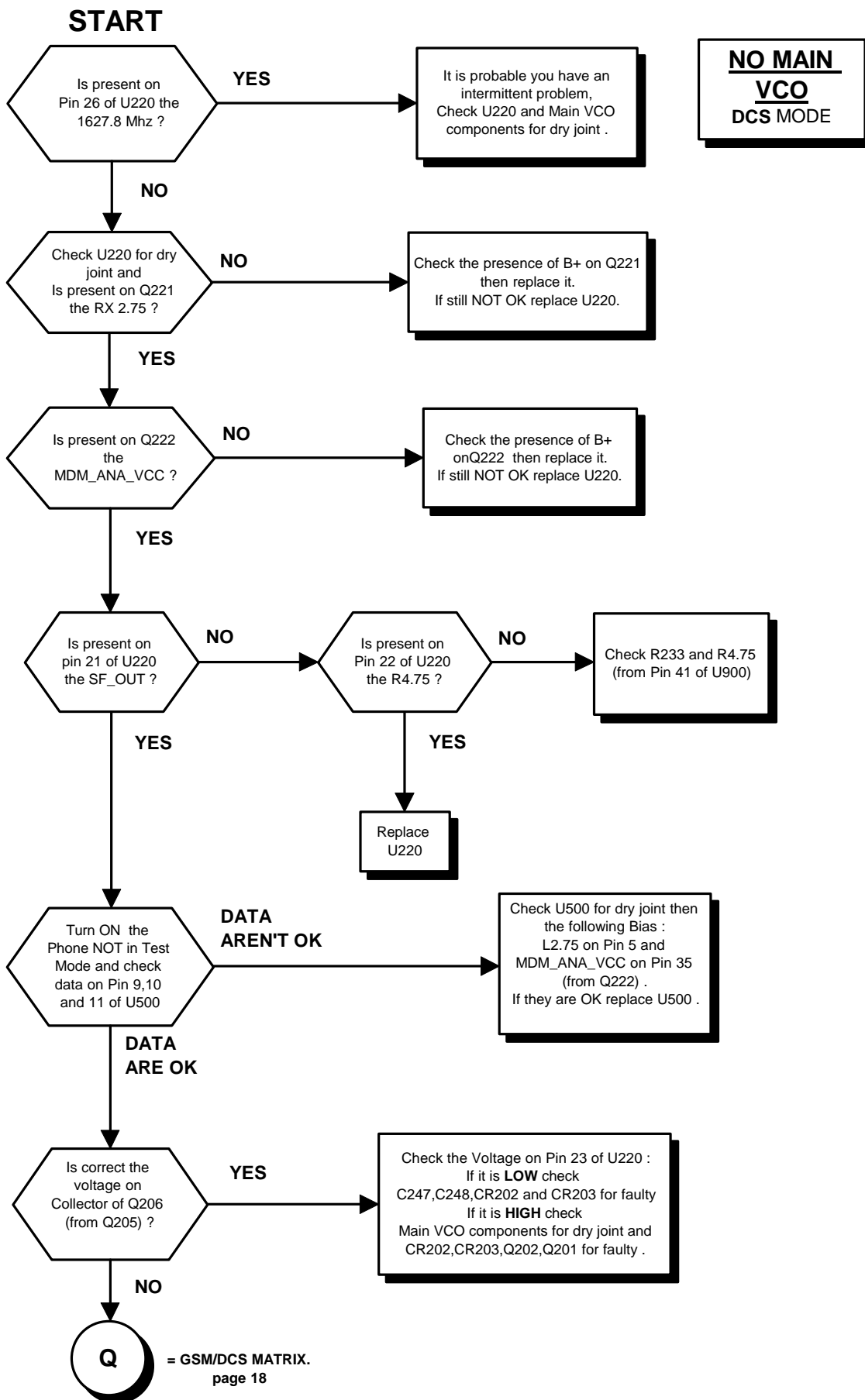


Put the Phone in TEST Mode and Digit 45062#





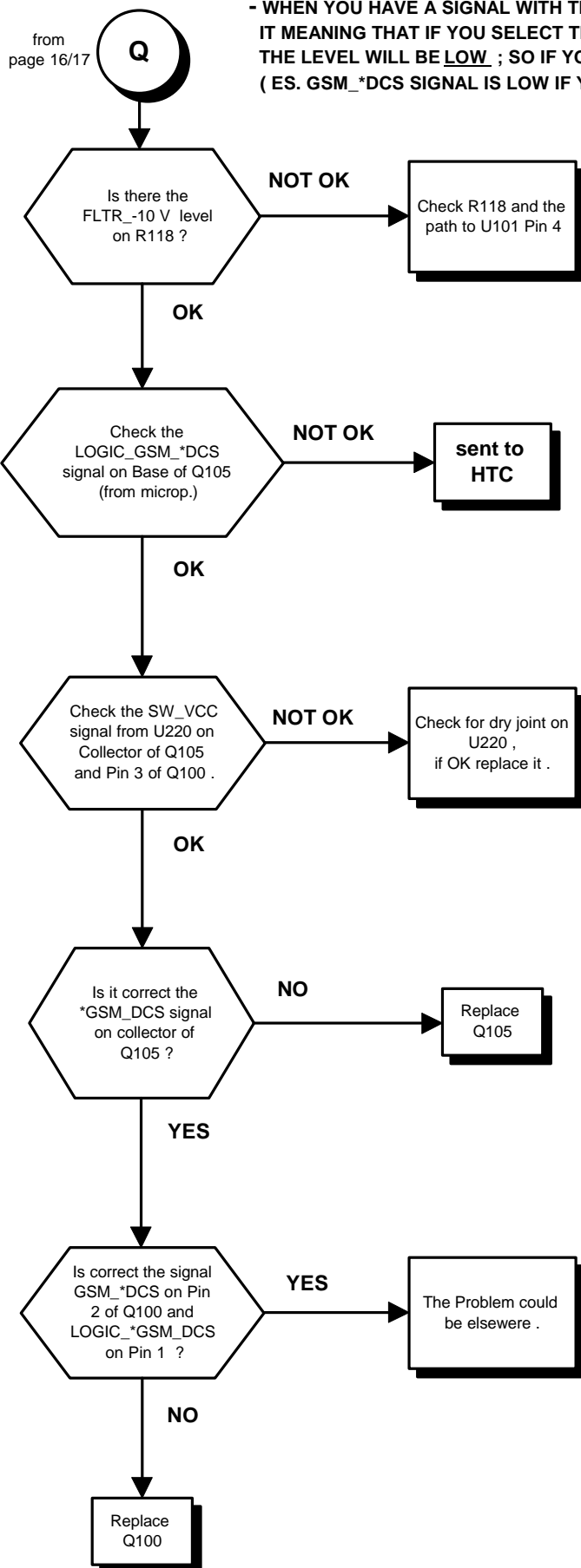
Put the Phone in TEST Mode and Digit 45700#





NOTE :

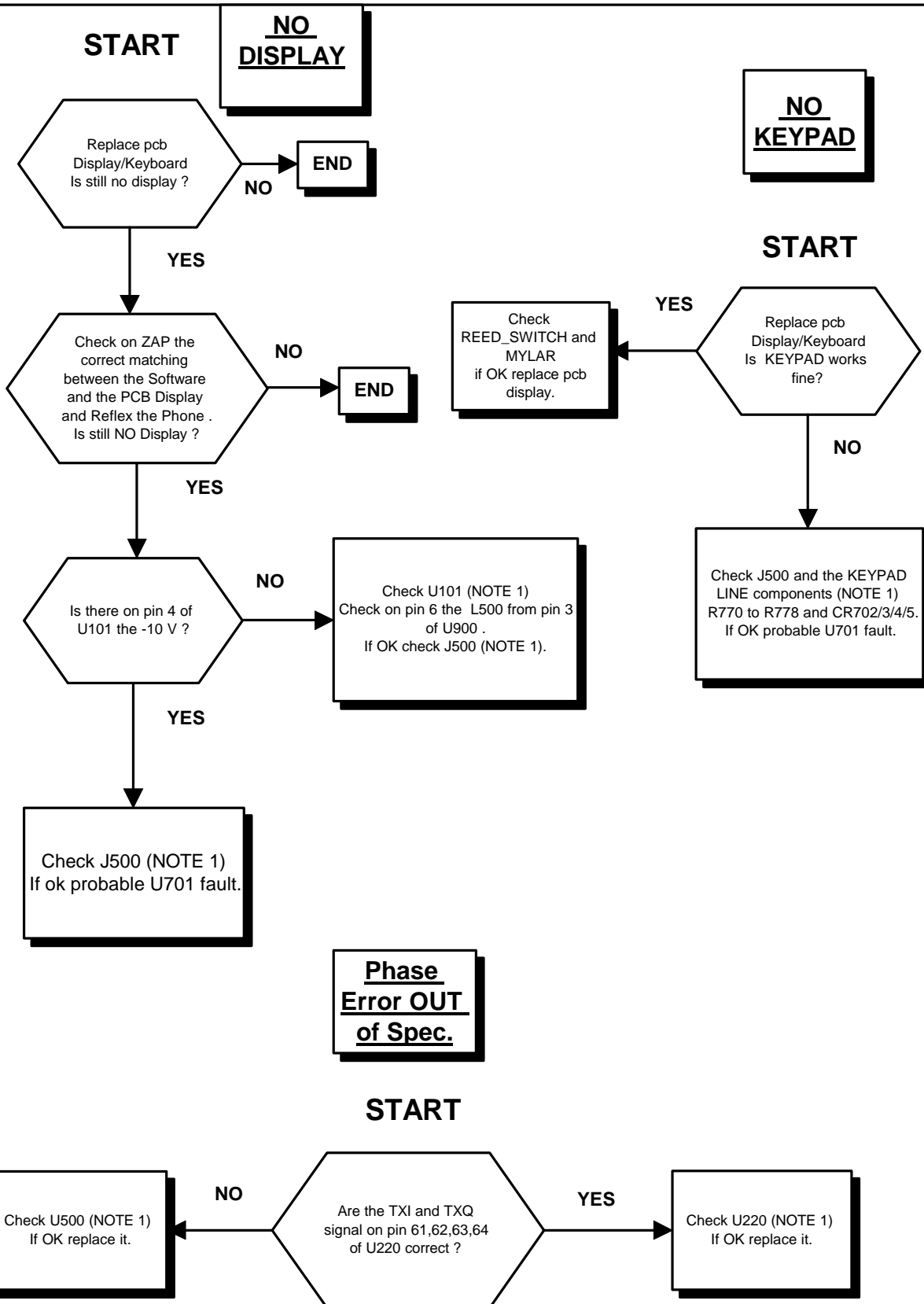
- WHEN YOU HAVE A SIGNAL WITH THE SYMBOL STAR (*) ES. GSM_*DCS , IT MEANING THAT IF YOU SELECT THE BAND WERE THERE IS THAT SYMBOL , THE LEVEL WILL BE LOW ; SO IF YOU SELECT THE OTHER BAND THE LEVEL WILL BE HIGH . (ES. GSM_*DCS SIGNAL IS LOW IF YOU SELECT A DCS CH AND HIGH WITH A GSM CH) .



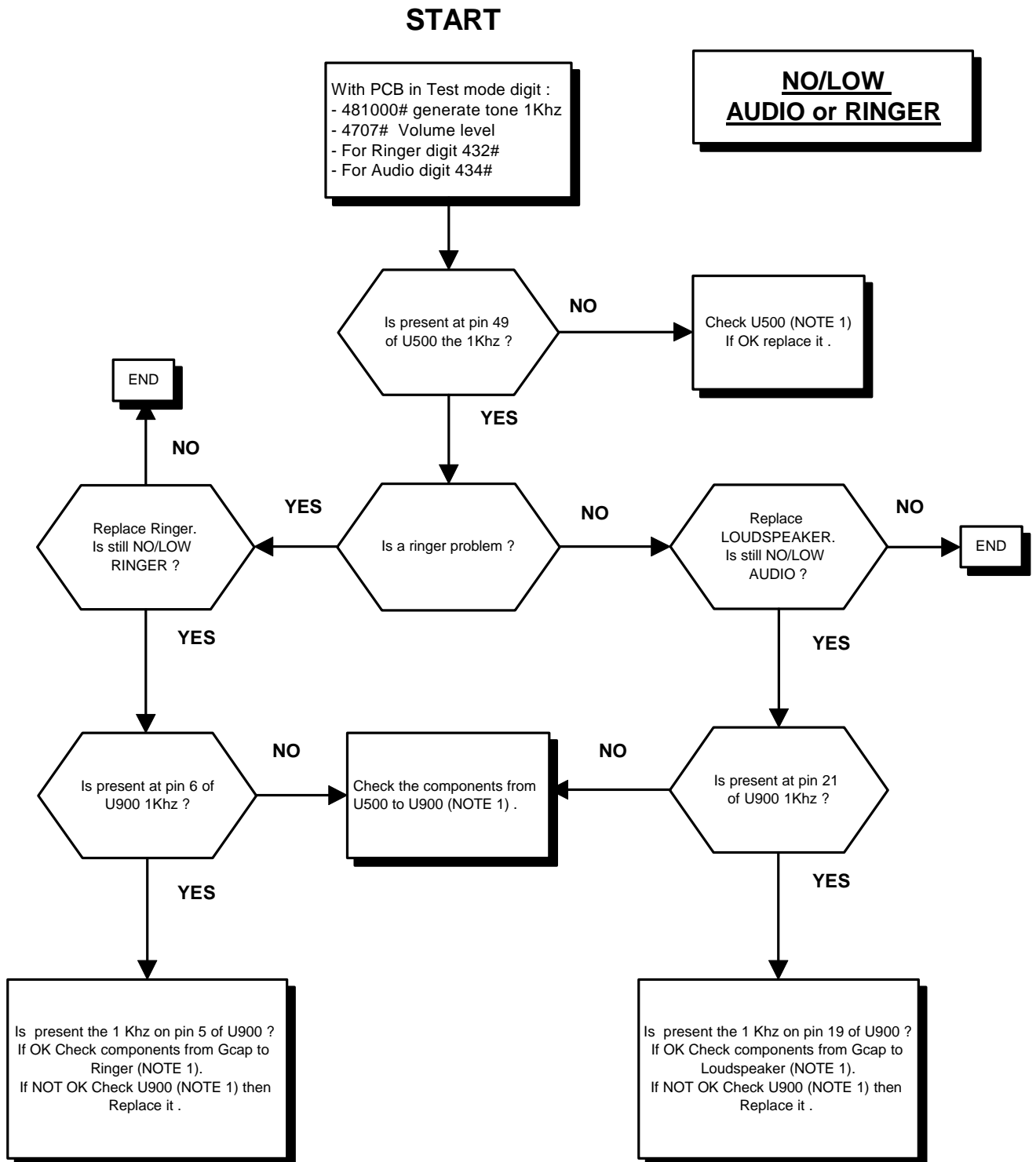
GSM DCS
MATRIX
ALL MODE



MOTOROLA GSM/DCS ZAP - Level 3 Procedure



**NOTE 1 : CHECK THE COMPONENT/S FOR PHYSICALLY DAMAGE
DRY JOINT AND GOOD POSITION .**



**NOTE 1 : CHECK THE COMPONENT/S FOR PHYSICALLY DAMAGE
DRY JOINT AND GOOD POSITION .**



START

With PCB in Test mode digit :
- 434# Audio Signal to Loudspeaker
- 4707# Audio Volume
- 36# Loop Back mode

NO MIC

Is present the
Mic signal at pin
10 of U900 ?

NO

Check U900 and the
components between Mic
and U900 (NOTE 1)
If OK replace U900 .

YES

If the Mic signal is present at pin 45
of U500 Check Smoc (NOTE 1)
then replace it .
If NOT present Check C816,R812
and track for faulty .

FREQUENCY OUT OF SPEC.

Replace Y702 then if still
NOT OK replace CR221 .

TX POWER BURST OUT OF SPEC.

Set the GATE 22 Station to the correct parametres
(Voltage,Cable loss,ecc) and rephase the phone; then Check
PA (U301),PAC IC (U390), SMOC (U500) NOTE 1 and
Compare the control signals with a good pcb.

PHONE FAILED SEE SUPPLIER

Put in TEST mode the phone and Digit 7100# .
Read the Return code :

INFO
00 : 03,04 or 05

Check U500
(NOTE1) IF OK
replace it .

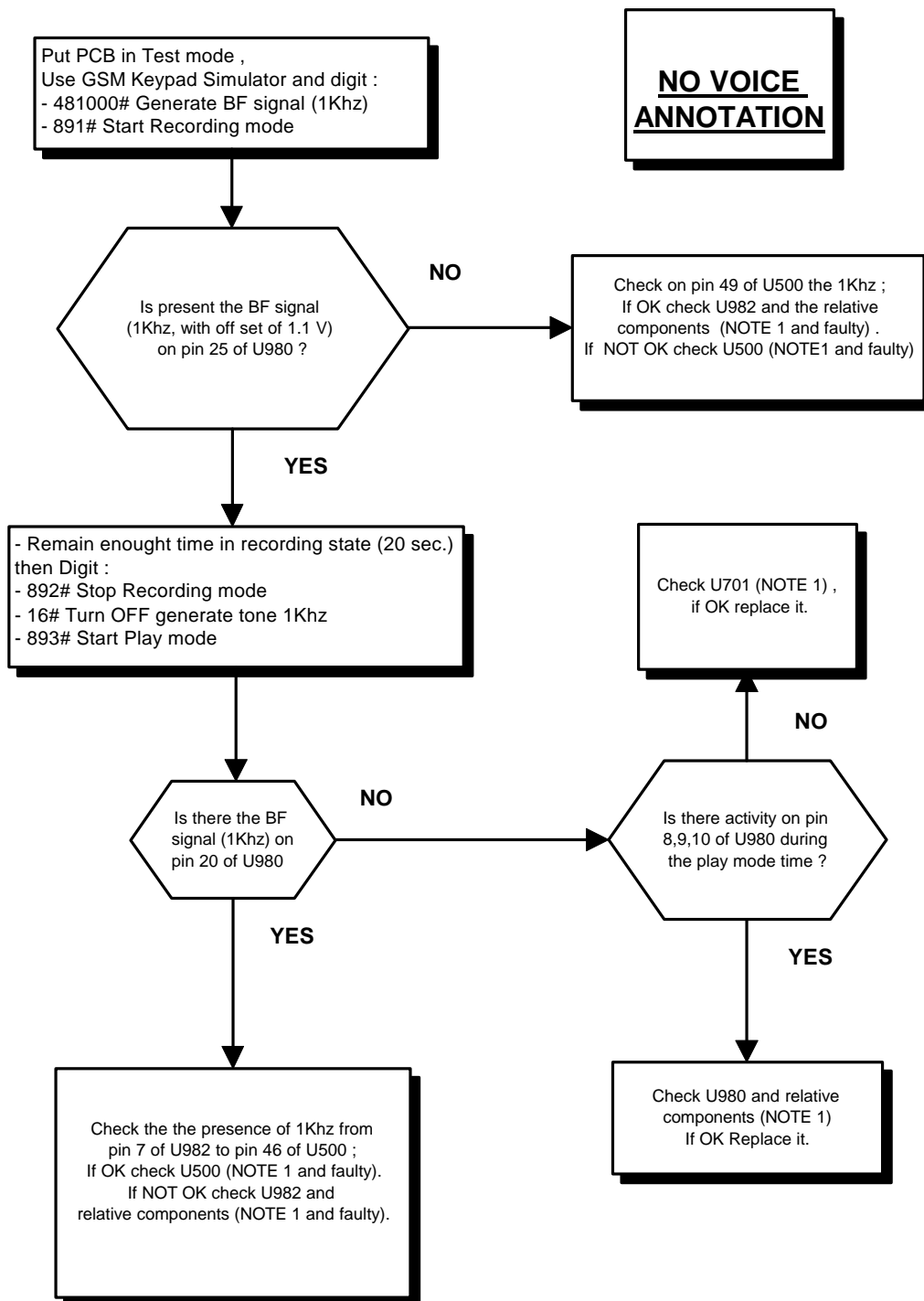
INFO
00 : 07

Reflexing the phone using
Emmibox or Master card
then 57#.
If the problem persist sent to
HTC

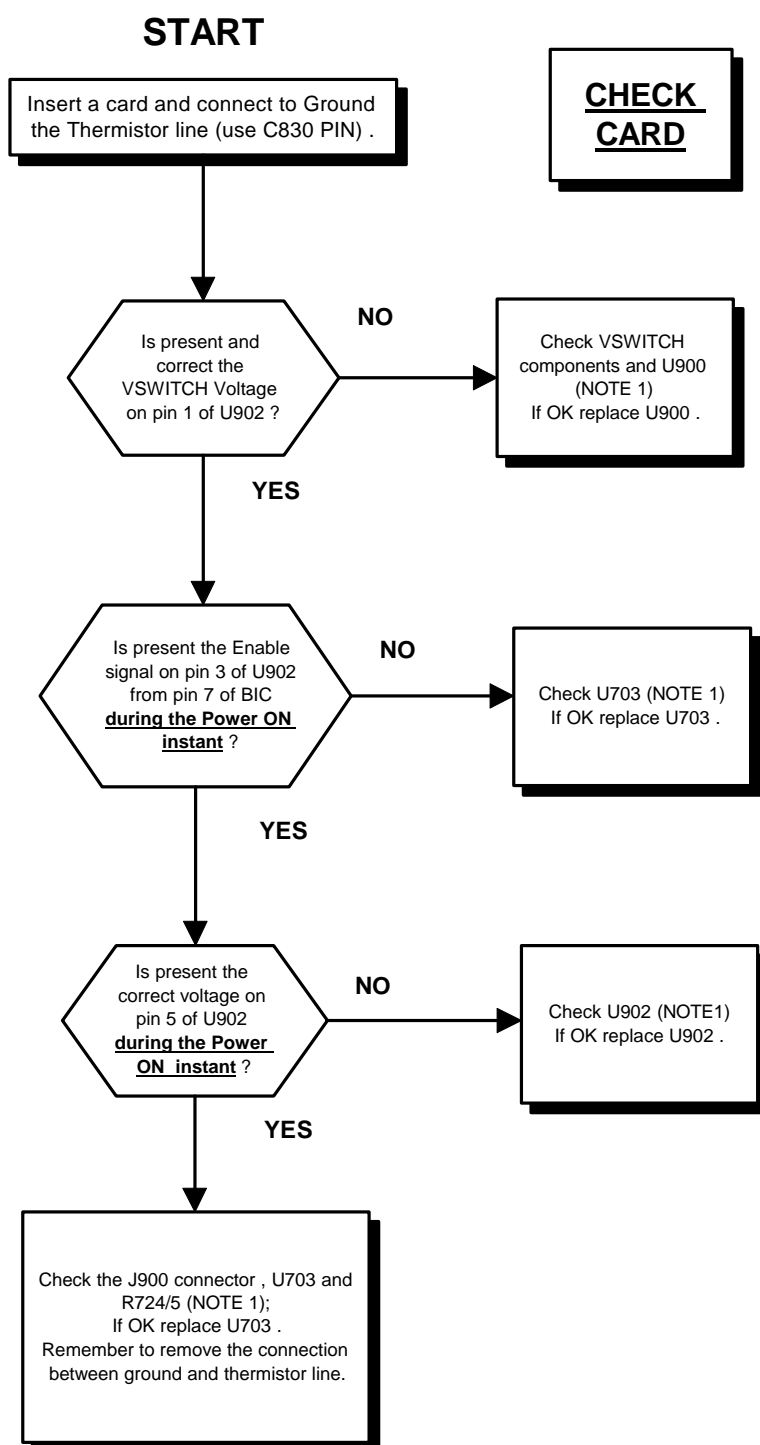
**NOTE 1 : CHECK THE COMPONENT/S FOR PHYSICALLY DAMAGE
DRY JOINT AND GOOD POSITION .**



START



**NOTE 1 : CHECK THE COMPONENT/S FOR PHYSICALLY DAMAGE
DRY JOINT AND GOOD POSITION .**



**NOTE 1 : CHECK THE COMPONENT/S FOR PHYSICALLY DAMAGE
DRY JOINT AND GOOD POSITION .**














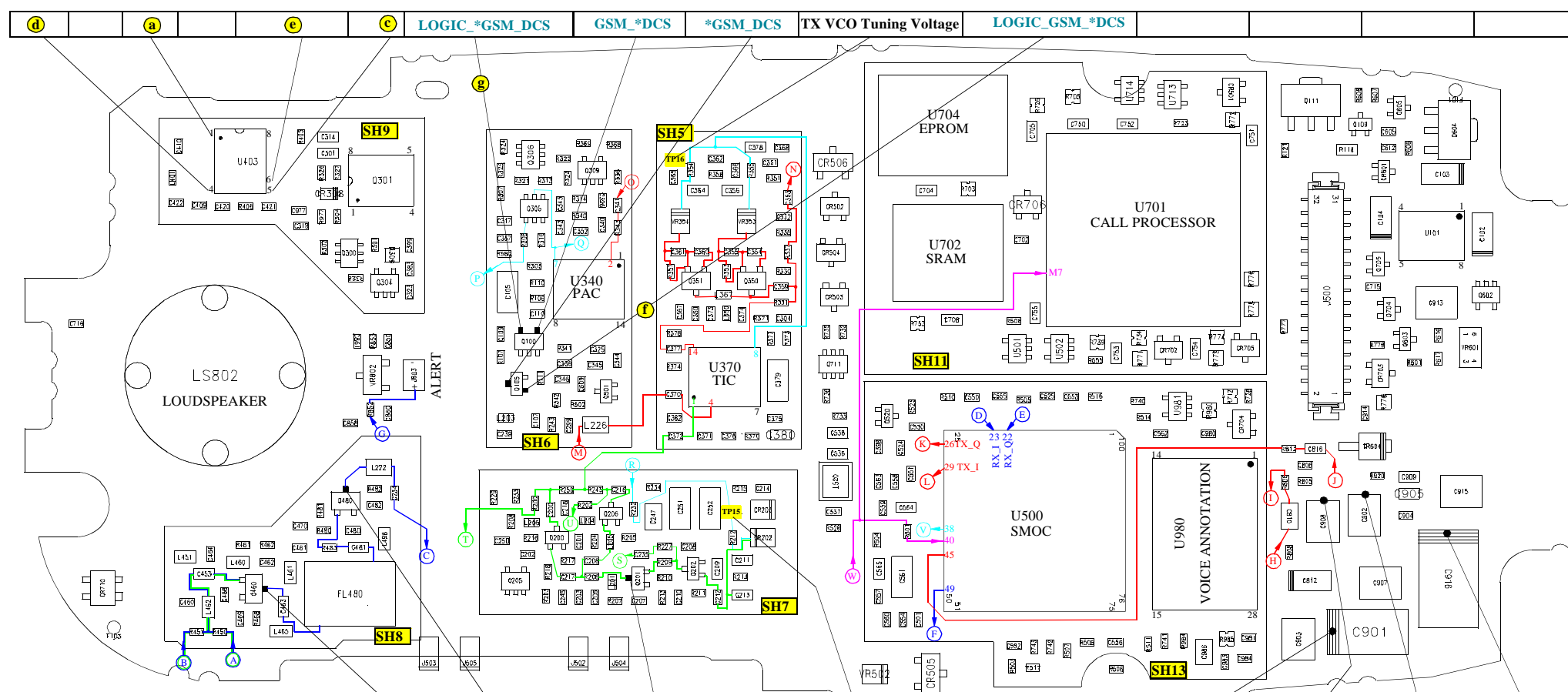


REVISIONS

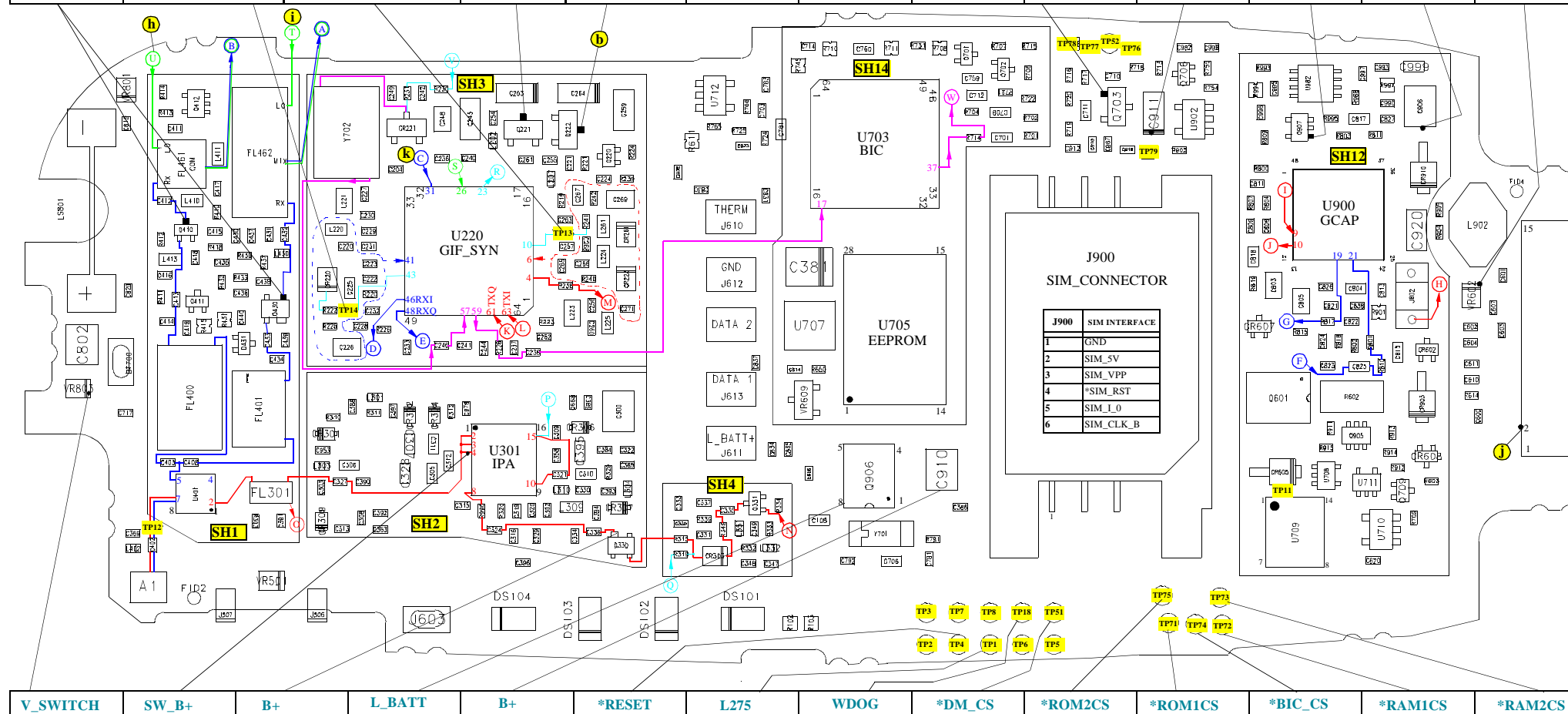
Europe Middle East & Africa Customer Services	15.07.98
LEVEL 4 COLOUR SCHEMATICS	Rev. 1.6
DUAL BAND ZAP	
Colin Jack, Michael Hansen, Billy Jenkins, Ralf Lorenzen	Page 2of 3

	RX SIGNAL PATH
	TX SIGNAL PATH
	MAIN VCO SIGNAL PATH
	TUNING VOLTAGES
	13 MHz REFERENCE CLOCK
	TESTPOINTS FROM FULL SCHEMATICS
	TESTPOINTS FROM BLOCK DIAGRAM

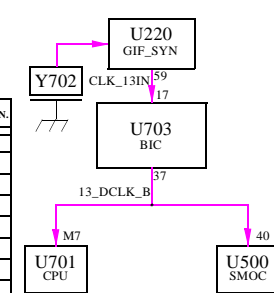
(A)	Amplified RX Signal
(B)	Amplified RX Signal
(C)	RX IF 215MHz
(D)	RX I Signal
(E)	RX Q Signal
(F)	Analog RX Signal
(G)	Amplified Analog RX Signal
(H)	Analog TX Mic Signal
(I)	Analog TX Mic Signal
(J)	Amplified Analog TX Mic Signal
(K)	TX Q Signal
(L)	TX I Signal
(M)	TX IF Frequency DCS/GSM 120/170MHz
(N)	TX VCO Signal
(O)	TX VCO Feedback Signal
(P)	TX Exciter via Shift Level
(Q)	TX Exciter Signal
(R)	Main VCO Tuning Voltage
(S)	Main VCO Feedback Line
(T)	DCS Main VCO Signal
(U)	GSM Main VCO Signal
(V)	AFC Tuning Voltage
(W)	I3_DCLK_B



			RX275	SW_VCC	SF_OUT		Main VCO Tun. Volt.			L500	R275	L275	V_SWITCH
RX275	RX Local Osc Tun. Volt.	TX Local Osc Tun. Volt.	RX275	MDM_ANA_VCC				DOWNLINK	SIM_5V	V_SWITCH	R475	EXT_B+	



J600	10 PIN EXT.CO
1	GND
2	SW_RF
3	GND
4	BATT_FDBA
5	MAN_TEST
6	RS232_TX
7	RS232_RX
8	AUDIO_IN
9	AUDIO_OUT
10	GND
11	UPLINK
12	DOWNLINK
13	DSC_EN_B
14	EXT_B+
15	GND



	Bootcode TP's
TP1	L275
TP2	GND
TP3	GND
TP4	*RESET
TP5	BKPT
TP6	FREEZE
TP7	IFETCH
TP8	PIPE
TP11	L_BATT+
TP12	RX TX ANT_SIGNAL
TP13	TX LOCAL OSC TUNIN
TP14	RX LOCAL OSC TUNIN
TP15	MAIN VCO TUNING
TP16	TX VCO TUNING
TP18	WDOG
TP51	*DM_CS
TP52	SVREG2
TP71	*ROM1CS
TP72	*RAM1CS
TP73	*RAM2CS
TP74	*BIC_CS
TP75	*ROM2CS
TP76	NCO
TP77	SIN1
TP78	S_NO
TP79	SOUT0

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LEVEL 3 COLOUR SIGNAL FLOW	Rev. 1.2
Dual Band_Zap	
Ralf Lorenzen, Michael Hansen, Colin Jack, Billy Jenkins	Page 1



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Europe, Middle East & Africa
Cellular Subscriber Group

Platform 'Z' Refresh

Standard Presentation



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Europe, Middle East & Africa
Cellular Subscriber Group

Platform 'Z' Refresh

New Features

New hardware features

- Improved VibraCall™
- Improved sensitivity of keypad

New software features

- SIM toolkit class 2
- Support for CSP based on CPHS V4.2
- New Quick Access items:
 - Show Date/Time
 - Find New Network
 - Show credit remaining
 - Note: Key answer only, Talk/Fax, Show My ID next call have been removed.



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Platform 'Z' Refresh

Eastern European Languages

- Russian
- Lithuanian
- Slovakian
- Croation
- Serbian
- Bulgarian
- Romanian
- Slovenia
- Latvian
- Estonian
- Ukraine



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Platform 'Z' Refresh

New Features

MMI improvements

- SMS improvements
 - 'Delete All Messages' option
 - Reply with a message
 - SMS phone book access
- Increase SIM phonebook support to 255 names/numbers
- Increase SMS storage from 35 to 75 messages
- Change CLI lookup to use 8 digits
- Conference call/call transfer usability improvements



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Platform 'Z' Refresh

New Features

Other New Features:

- Orange data field support (Orange only)
- Viag Homezone (Viag only)
- Tri-Coder (Available Dec 98)



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Platform 'Z' Refresh

Other Information

- New manuals to be created
- Model number structure; up-suffix from 'B' version to 'C' version
 - ex: SE0006BB1B1 to be SE0006CB1B1 for refresh
- To avoid confusion, the market name will not change
- Future plans to add Tri-Codec (FR/EFR/HR) to cd900 series
- Not up-grade in the field

Dual Band Zap Level 3 Parts

AL LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
Alert	Alert	5009005J03	Q601	Power Transistor Charging	4809579E04
BT700	Connector Real Time Clock	0909888M01	Q602	Transistor Battery Feedback	4809939C05
CR607	Diode Charge Line	4809606E07	R602	Resistor I Sense	0680195M64
CR910	Diode Switched Supply	4809653F02	U500	SMOC IC (Motorola)	5199332C03
J500	Keyboard Connector	2809424M01	U500	Firestorm IC (Lucent)	5199374C01
J600	Connector-Extern	0909449B03	U703	BIC IC	5109962C11
J603	Connector Vibra	0909888M01	U900	GCAP	5109632D75
J802	Connector Microphone	0909195E01	U980	Voice Annotation IC	5109152M07
J803	Connector Speaker	0909888M04	U982	Amplifier IC	5109731C03
J900	SIM Connector	3909426M01	SH11	Shield Call Processor	2609482M01
LS802	Speaker	5009076E12	SH12	Shield GCAP	2609481M01
Mic	Microphone	5009536H15	SH13	Shield SMOC	2609483M01
Q501	Transistor TX_EN	4809607E05	SH14	Shield BIC / EEPROM	2609484M01

NOTE:

Replace U500 to the same type only:
(SMOC to SMOC (Motorola) or Firestorm to Firestorm (Lucent))

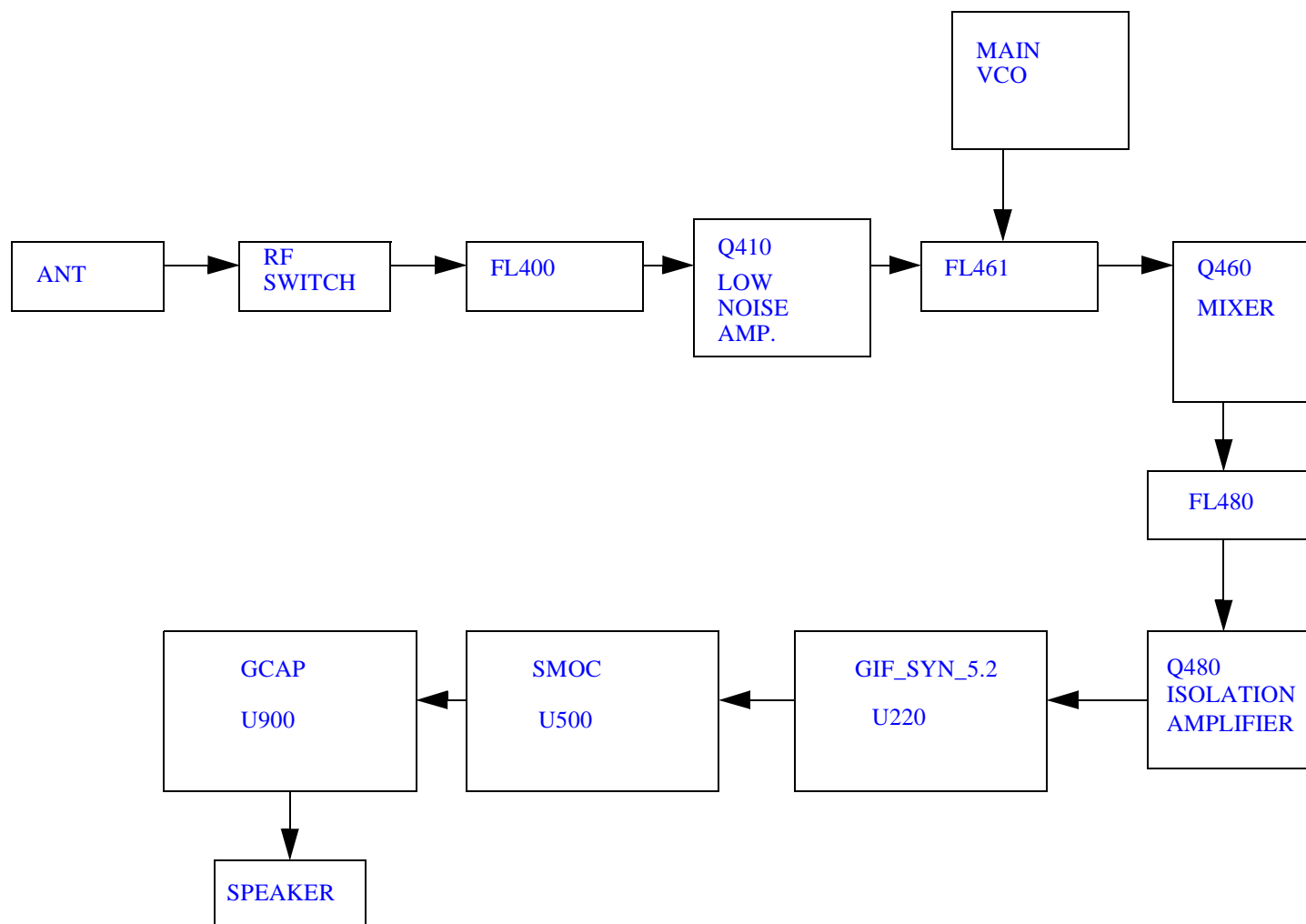
RF LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
A1	Antenna Connector	3909155T01	Q350-351	TX VCO Transistor	4809940E01
CR202	Main VCO Varactor	4809641F02	Q411	Receive Power Transistor	4809527E24
CR203	Main VCO Diode	4809948D10	Q412	GSM / DCS Switch	4809939C07
CR220	RX Local Osc. Varactor	4809641F02	Q430	Receive Power Transistor	4809527E32
CR221	Master Xtal Varactor	4809641F04	Q460	Receive Mixer Transistor	4809527E20
CR223	Tx Local Osc. Diode	4809948D05	Q480	IF Isolation Amplifier	4809940E01
CR261	Tx Local Osc. Varactor	4809641F02	U220	GIFSYN IC	5109632D92
CR303	TX Exciter Diode	4809948D10	U401	Antenna Switch IC	5109572E04
FL301	1st Rx Filter	9109193T05	U403	Switch Control	5109923D14
FL400	2nd Rx Filter	9109144M01	U301	PA Dual FET IC	4809527E31
FL401	VCO Filter	9109111C08	U370	TIC IC	5109879E12
FL480	IF Saw Filter	9109035M01	U340	PAC IC	5109632D91
FL461	RX GSM Injection Filter	9109157M01	VR353	TX VCO Varactor	4809877C06
FL462	RX DCS Injection Filter	9109429J04	VR354	TX VCO Variator	4809877C04
Q200	Main VCO Transistor	4809527E30	SH1	Shield Low Noise Ampl.	2609474M01
Q201-202	Main VCO Transistor	4809527E24	SH2	Shield PA	2609475M01
Q205	GSM / DCS Switch	4809939C07	SH3	Shield GIFSYN	2609476M01
Q221-222	Supply Transistor	4809579E18	SH4	Shield Exiter	2609477M01
Q305-306	PAC Transistor	4809939C06	SH5-SH7	Shield VCO TIC	2609480M01
Q309	GSM / DCS Switch	4809939C07	SH8	Shield Mixer Iso Ampl.	2609478M01
Q330	TX Buffer	4809527E26	SH9	Shield Rf Switch	2609479M01
Q331	TX Predriver	4809527E24			

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Customer Services
Level 3 Authorised**



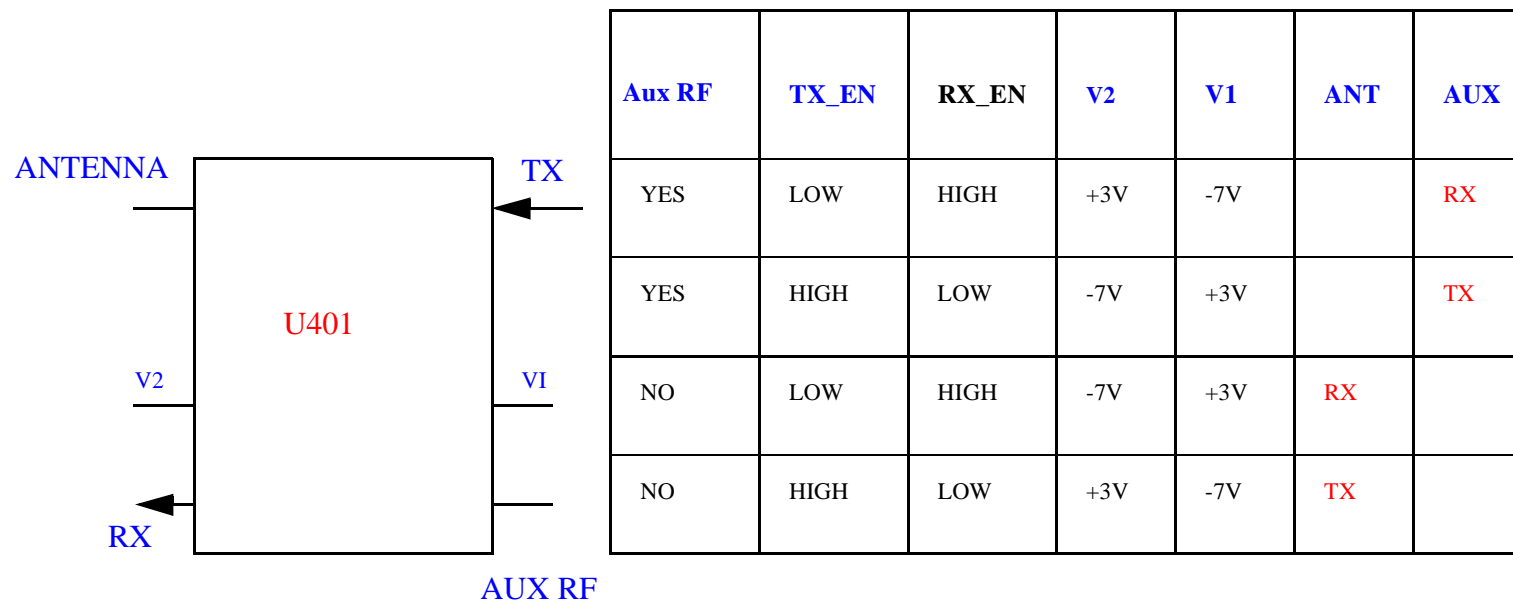
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ZAP RECEIVER BLOCK DIAGRAM (GSM)



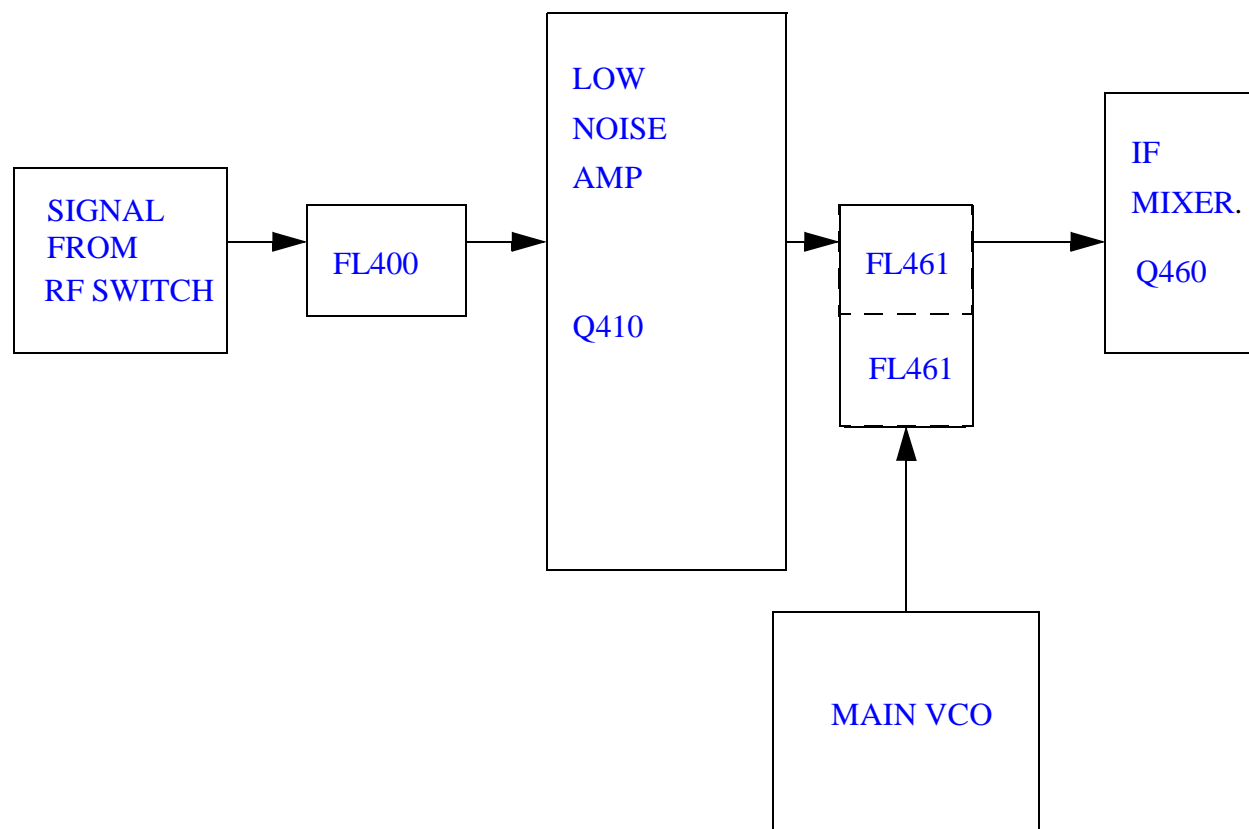
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ZAP T/R SWITCH COMBINATIONS



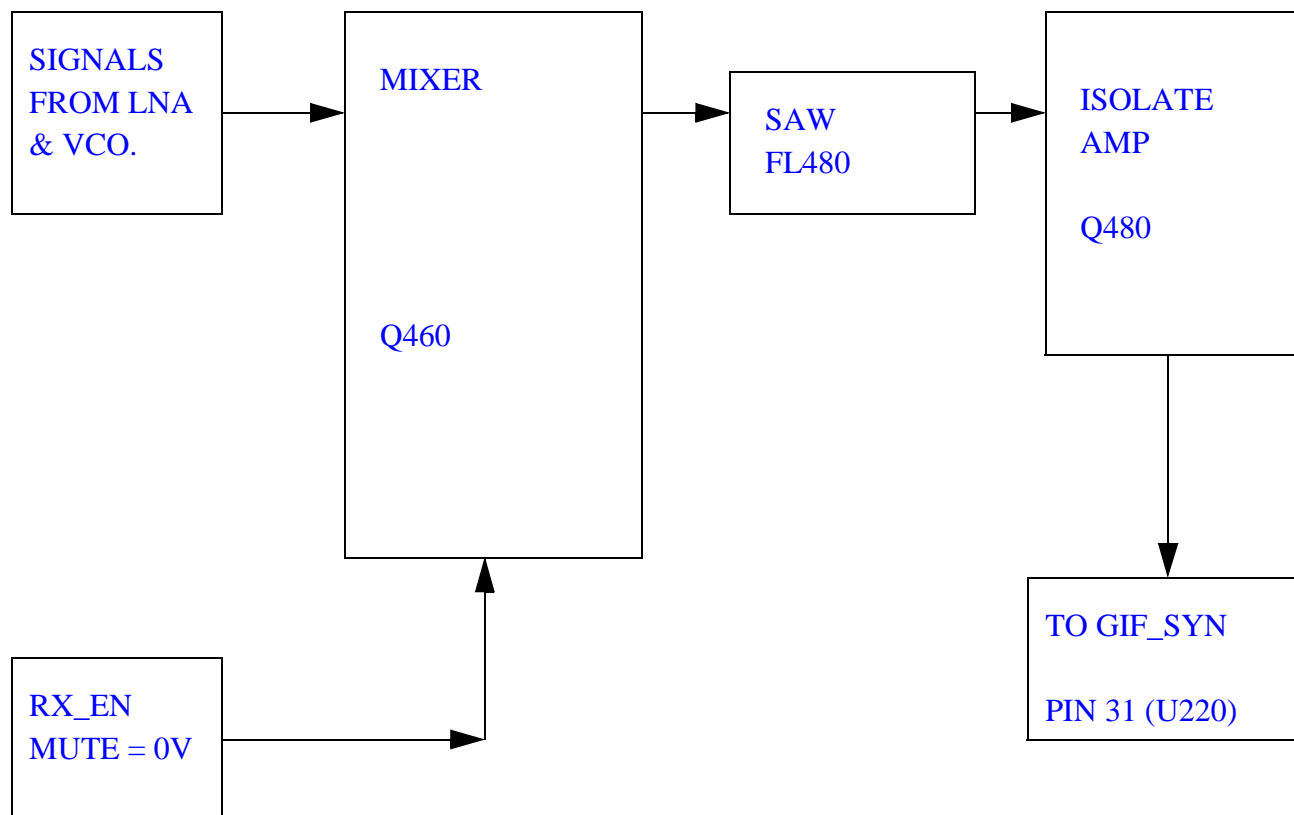
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RF SWITCH TO RECEIVER FRONT END BLOCK DIAGRAM (GSM)



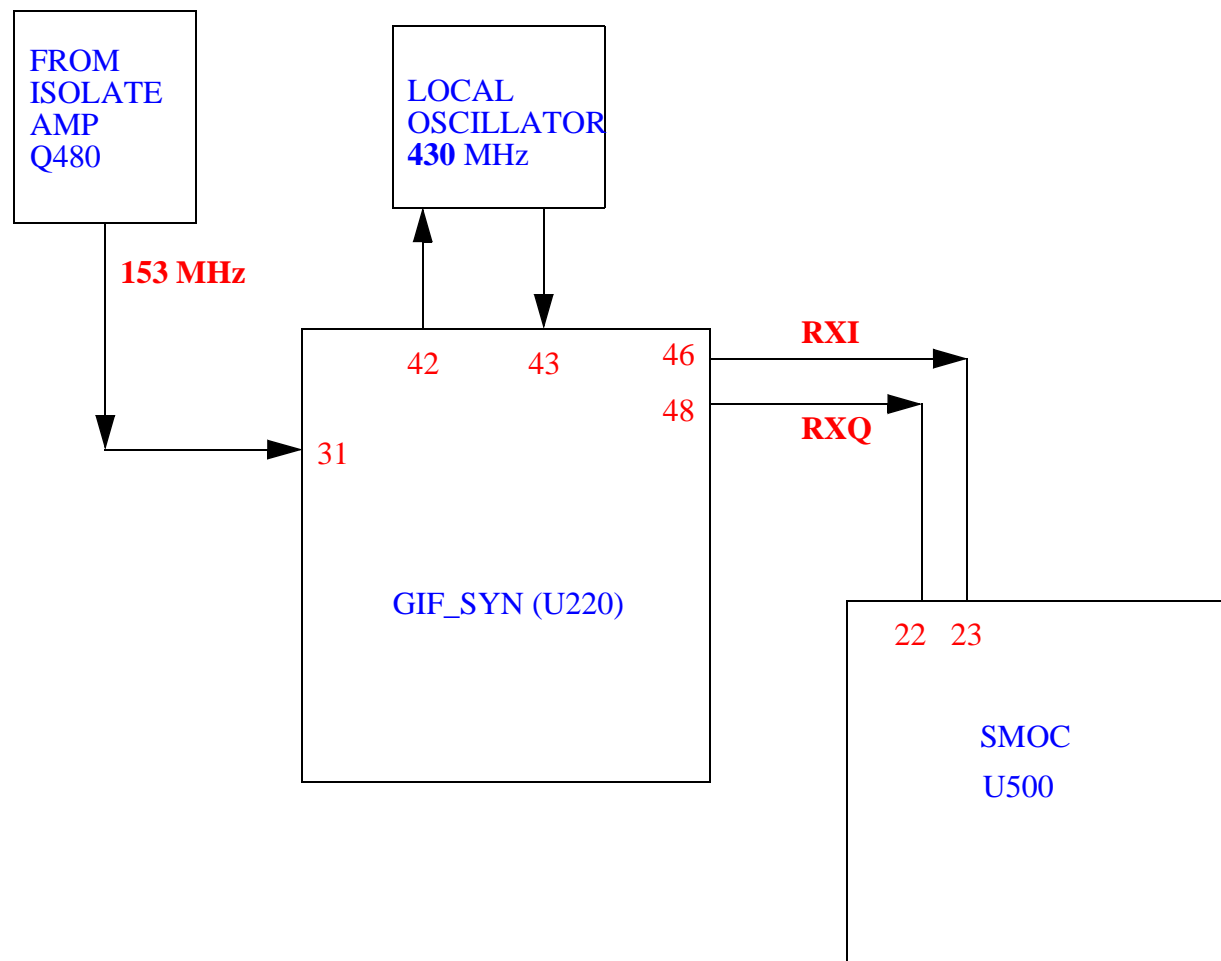
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BLOCK DIAGRAM OUTPUT OF LNA TO GIF_SYN (GSM).



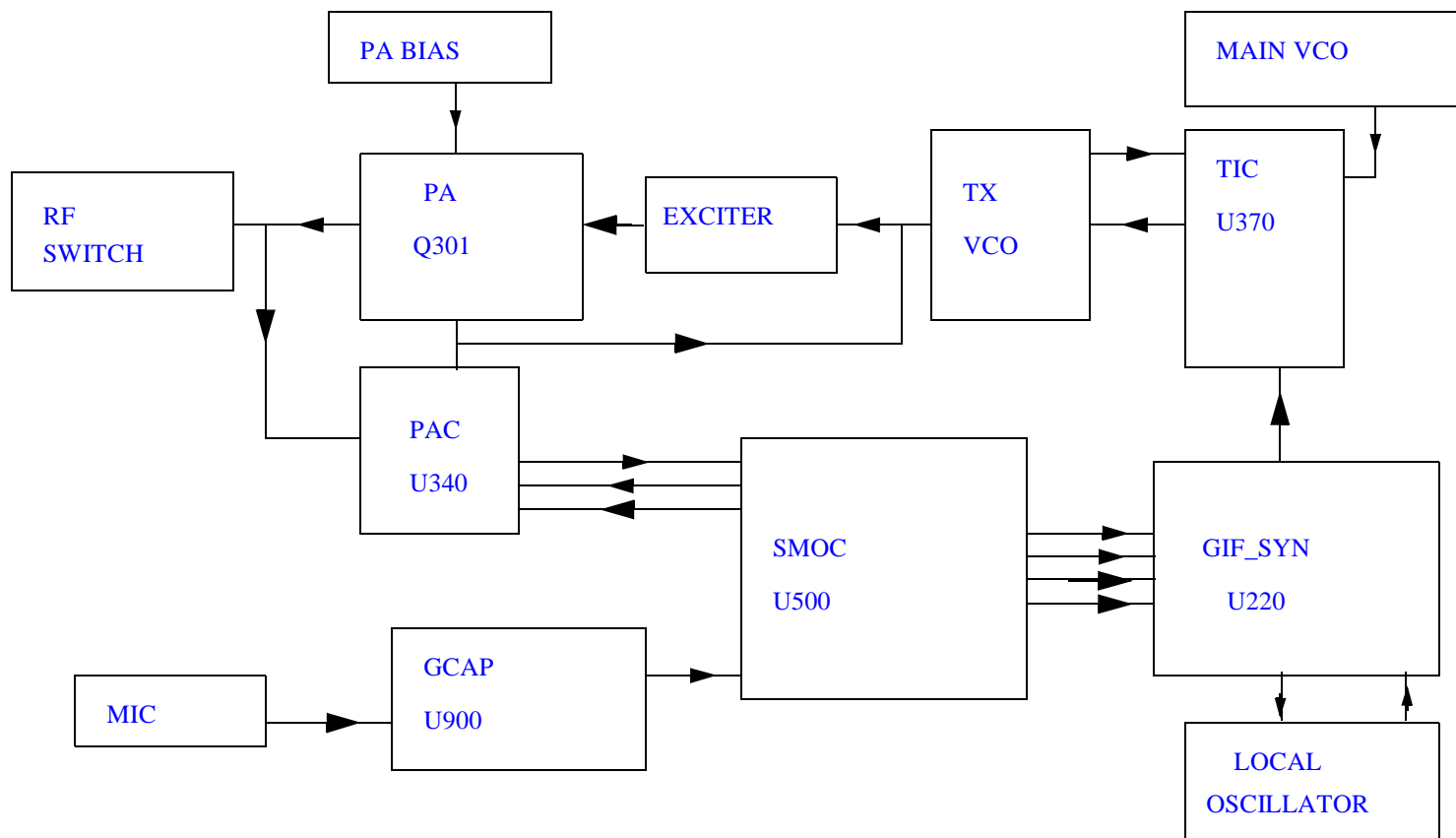
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BLOCK DIAGRAM ISOLATE AMP TO SMOC (GSM).



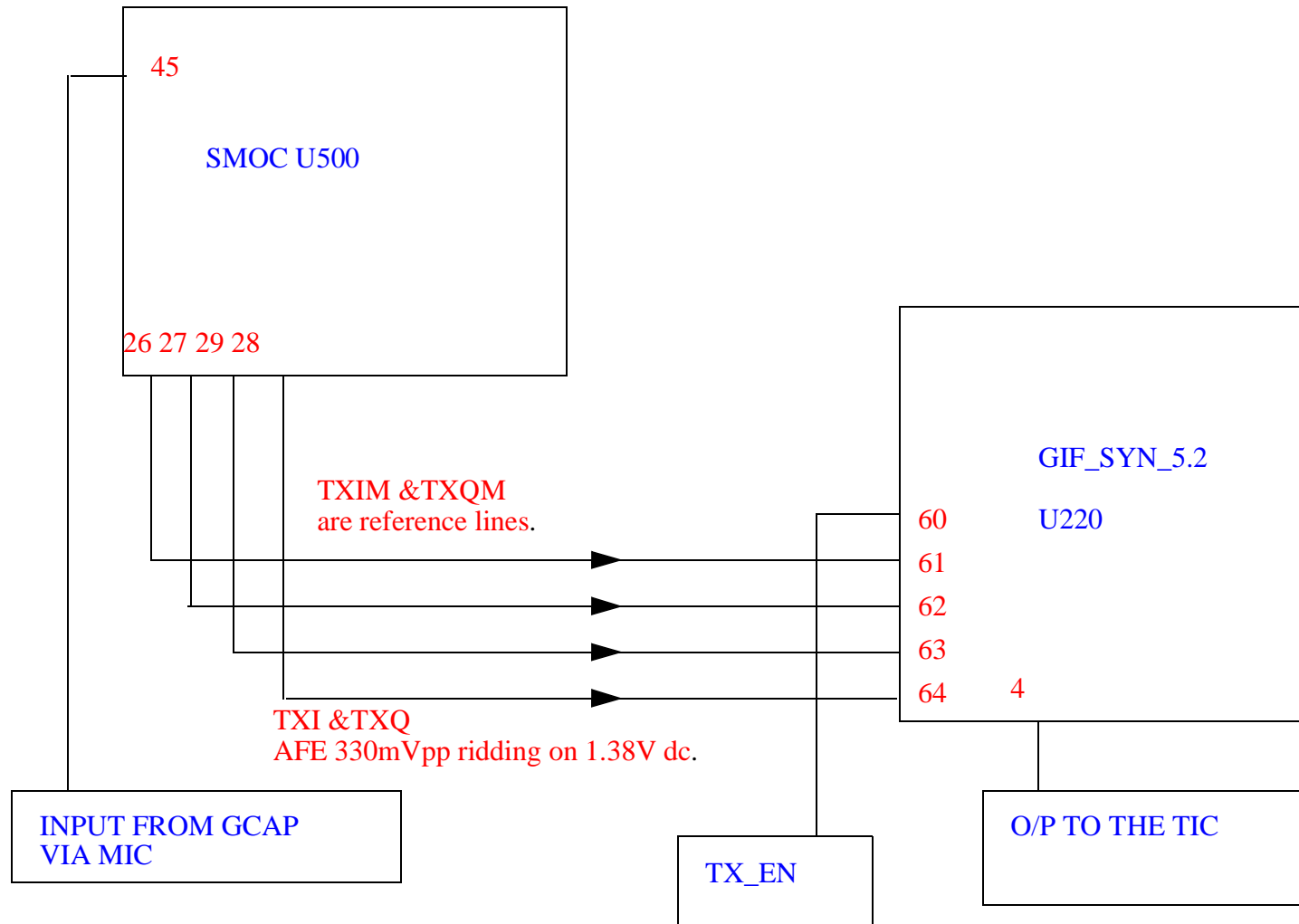
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ZAP TX BLOCK DIAGRAM.



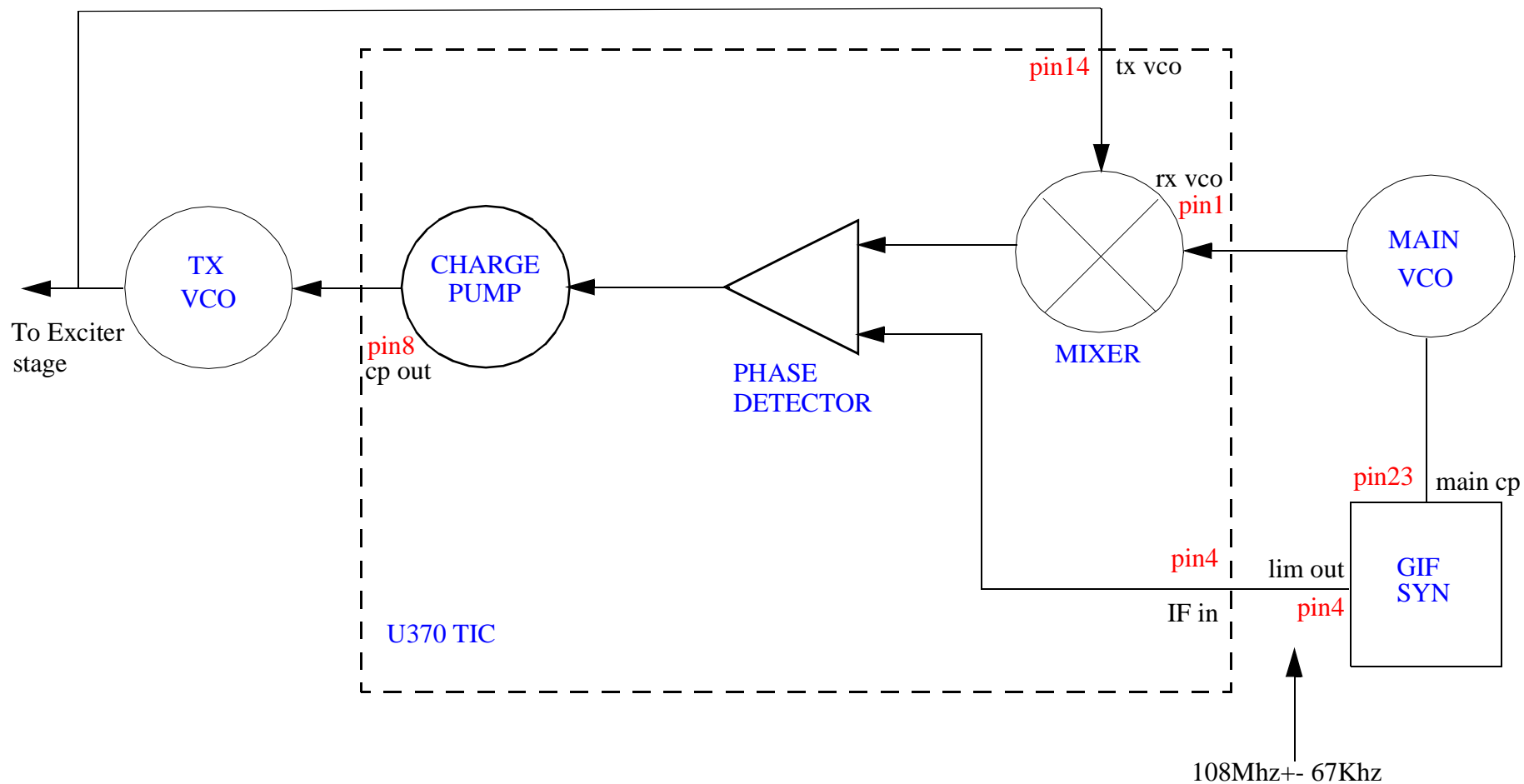
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MIC TO GIF_ SYN BLOCK DIAGRAM

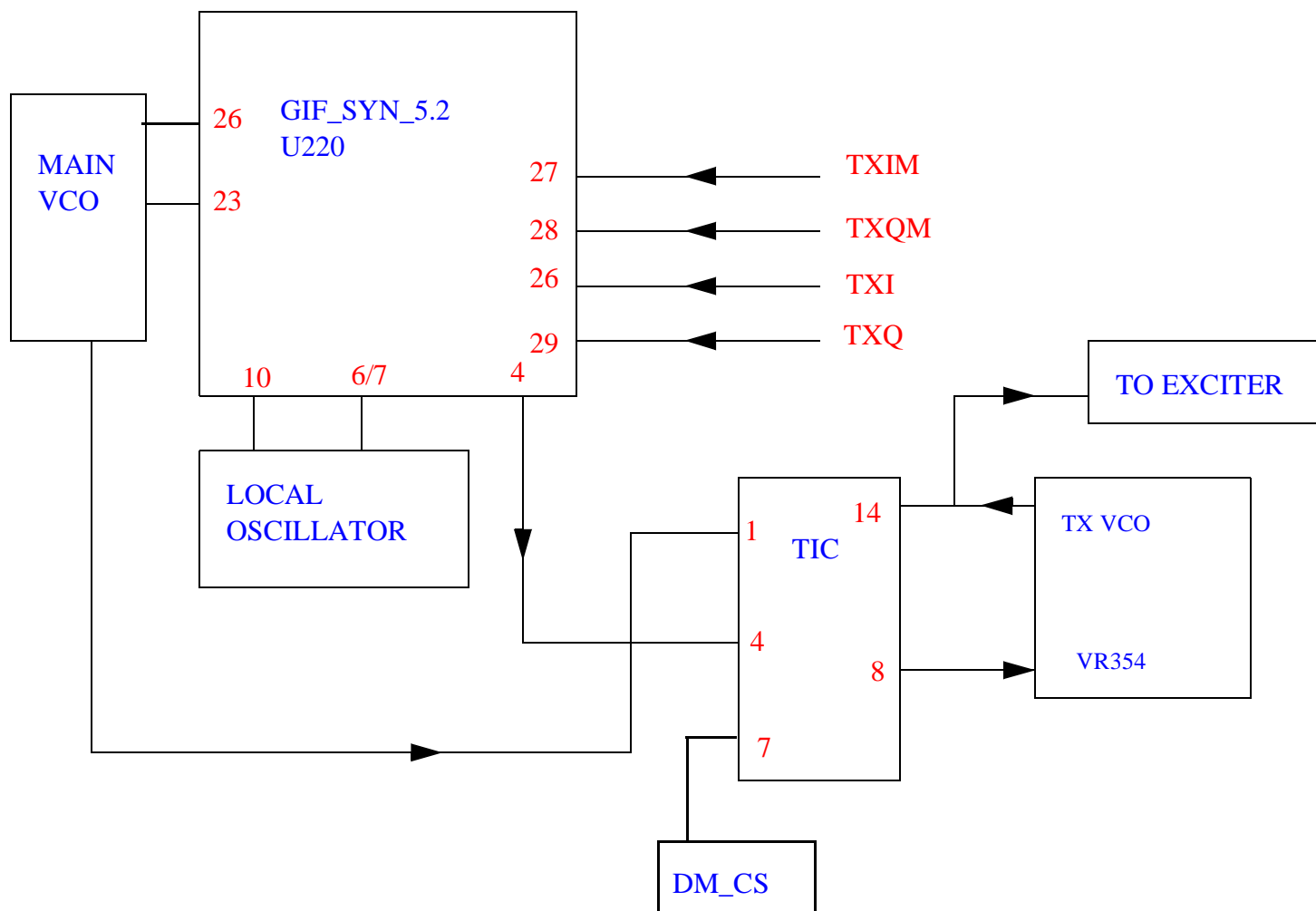


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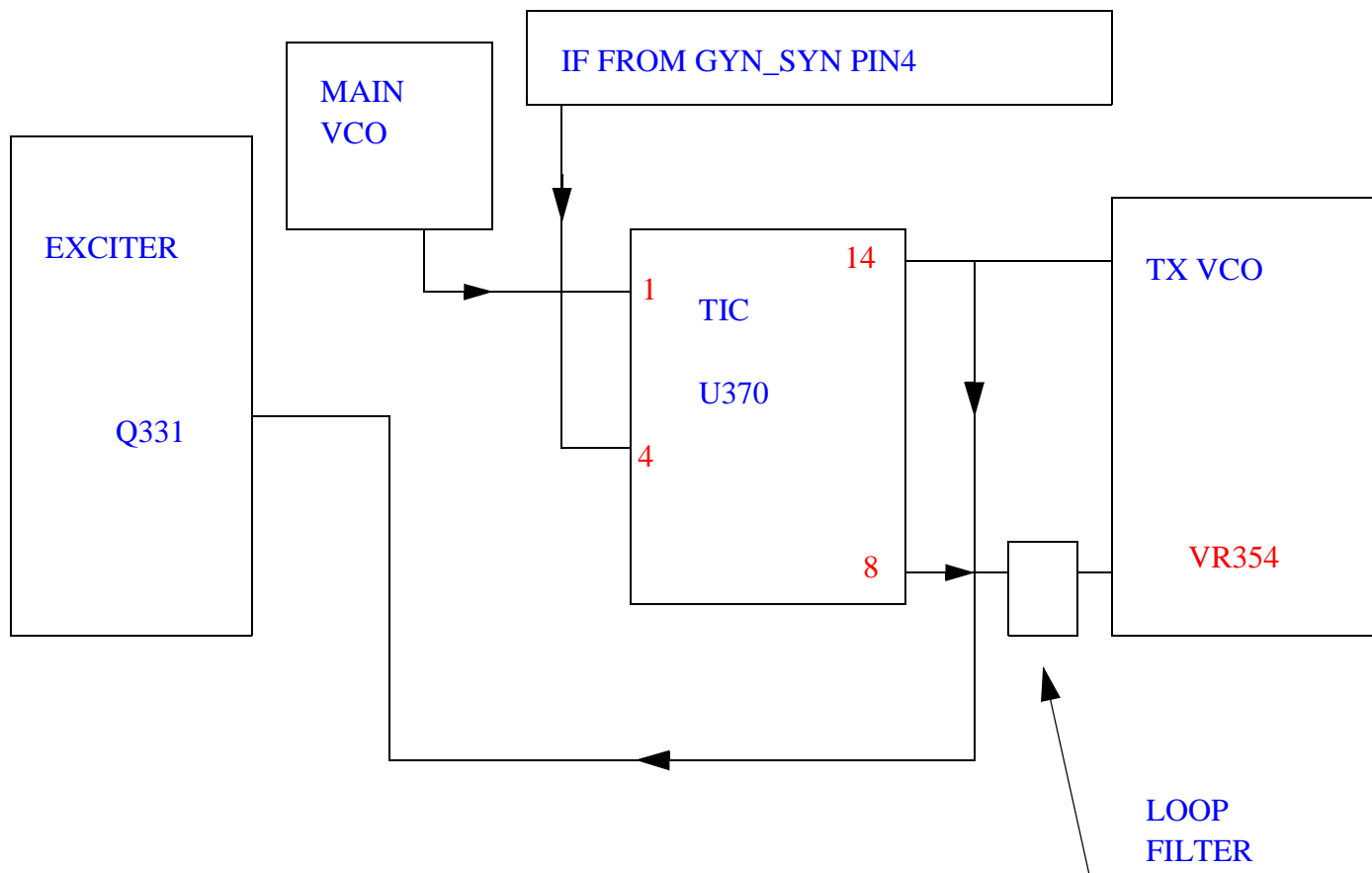
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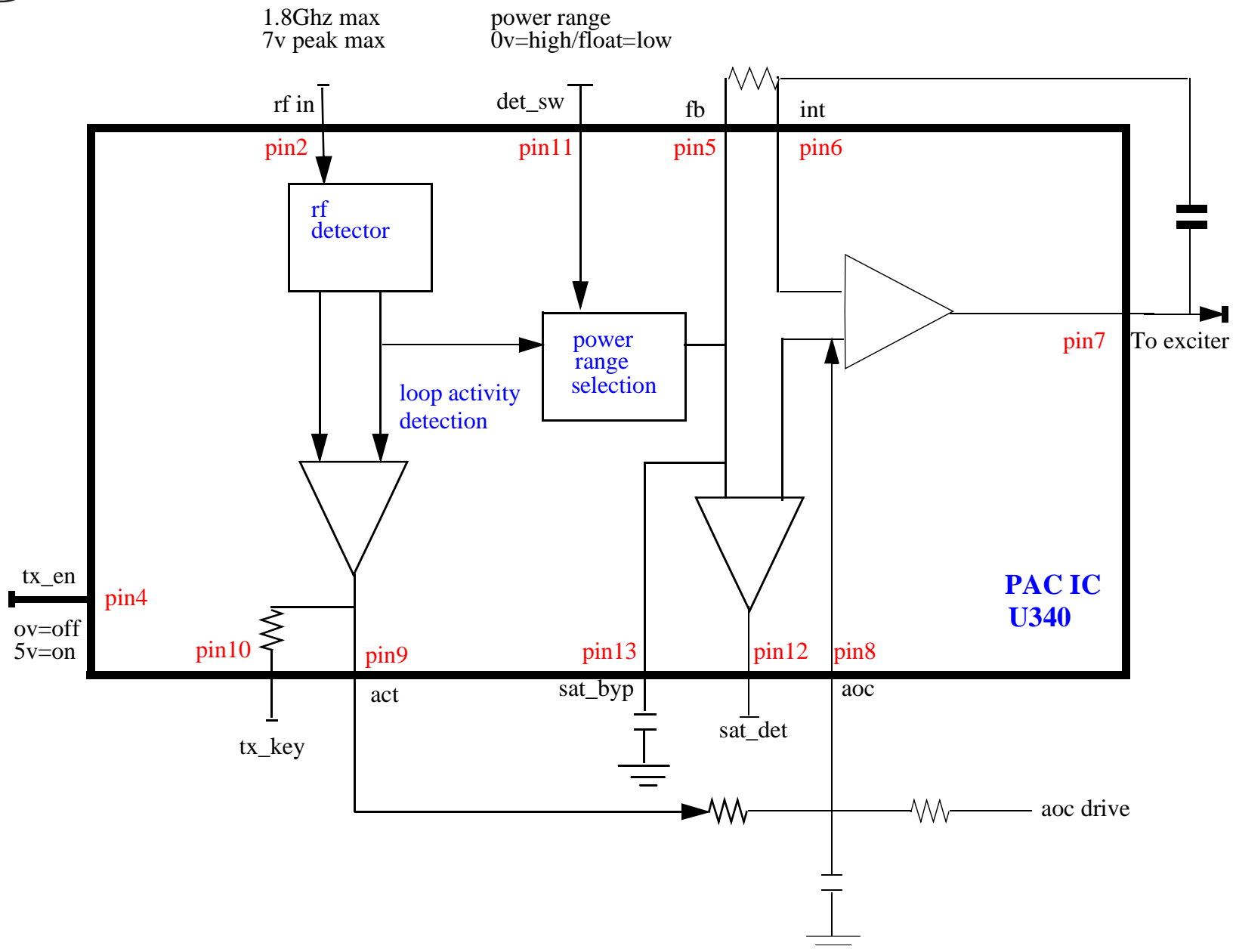
ZAP GIF SYN TO TIC BLOCK DIAGRAM (GSM)



MOTOROLA

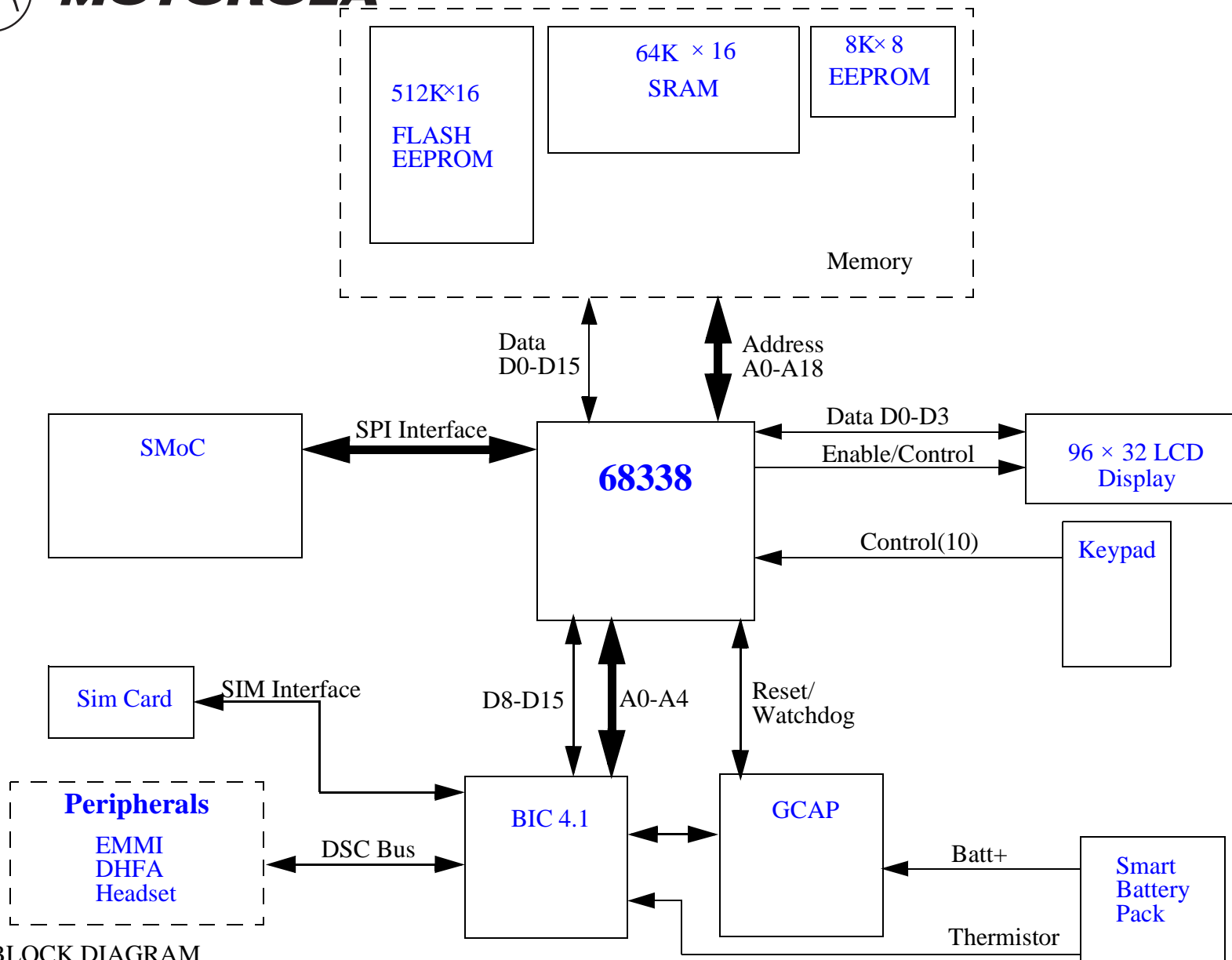


TX VCO TO EXCITER BLOCK DIAGRAM (GSM)





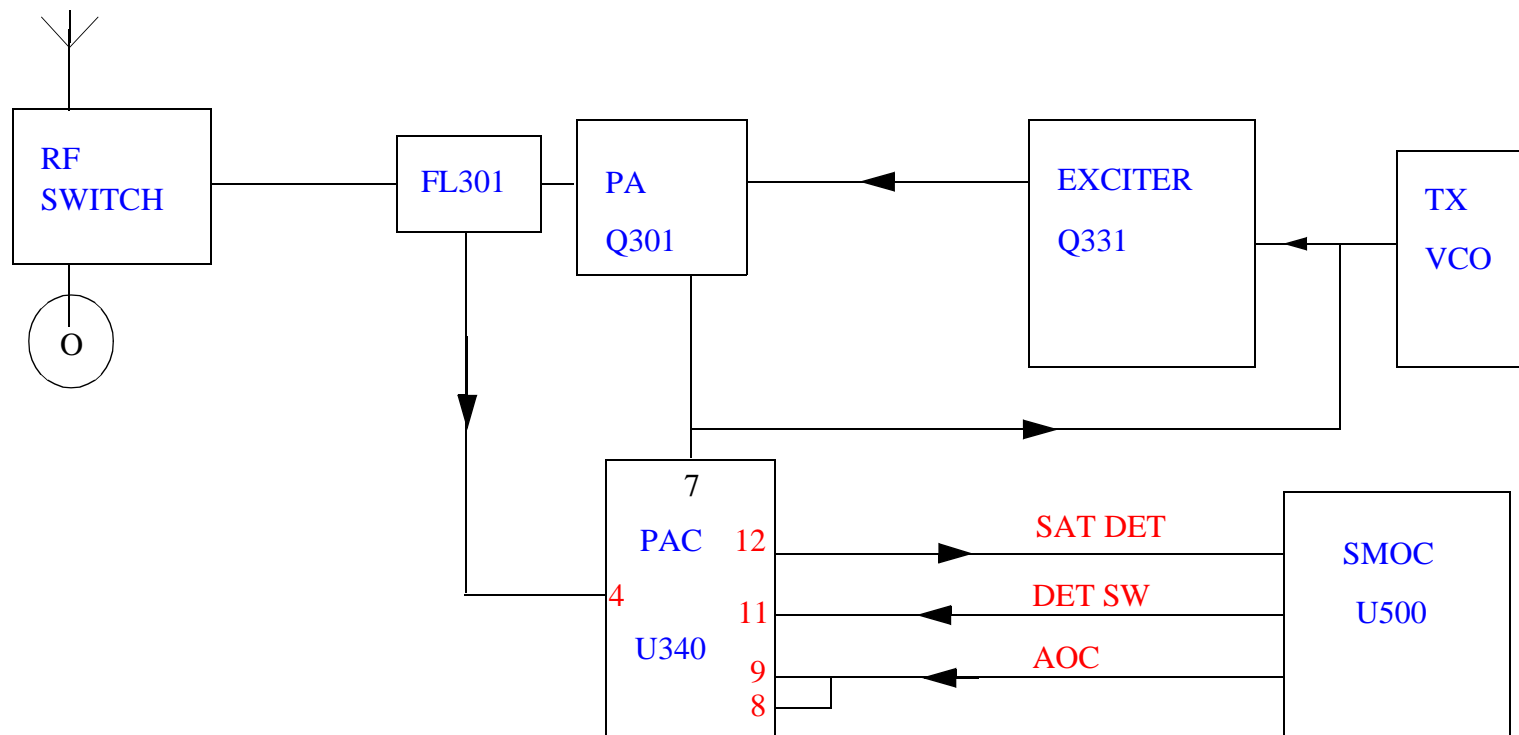
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LOGIC BLOCK DIAGRAM



MOTOROLA



EXCITER TO POWER AMP BLOCK DIAGRAM



MOTOROLA

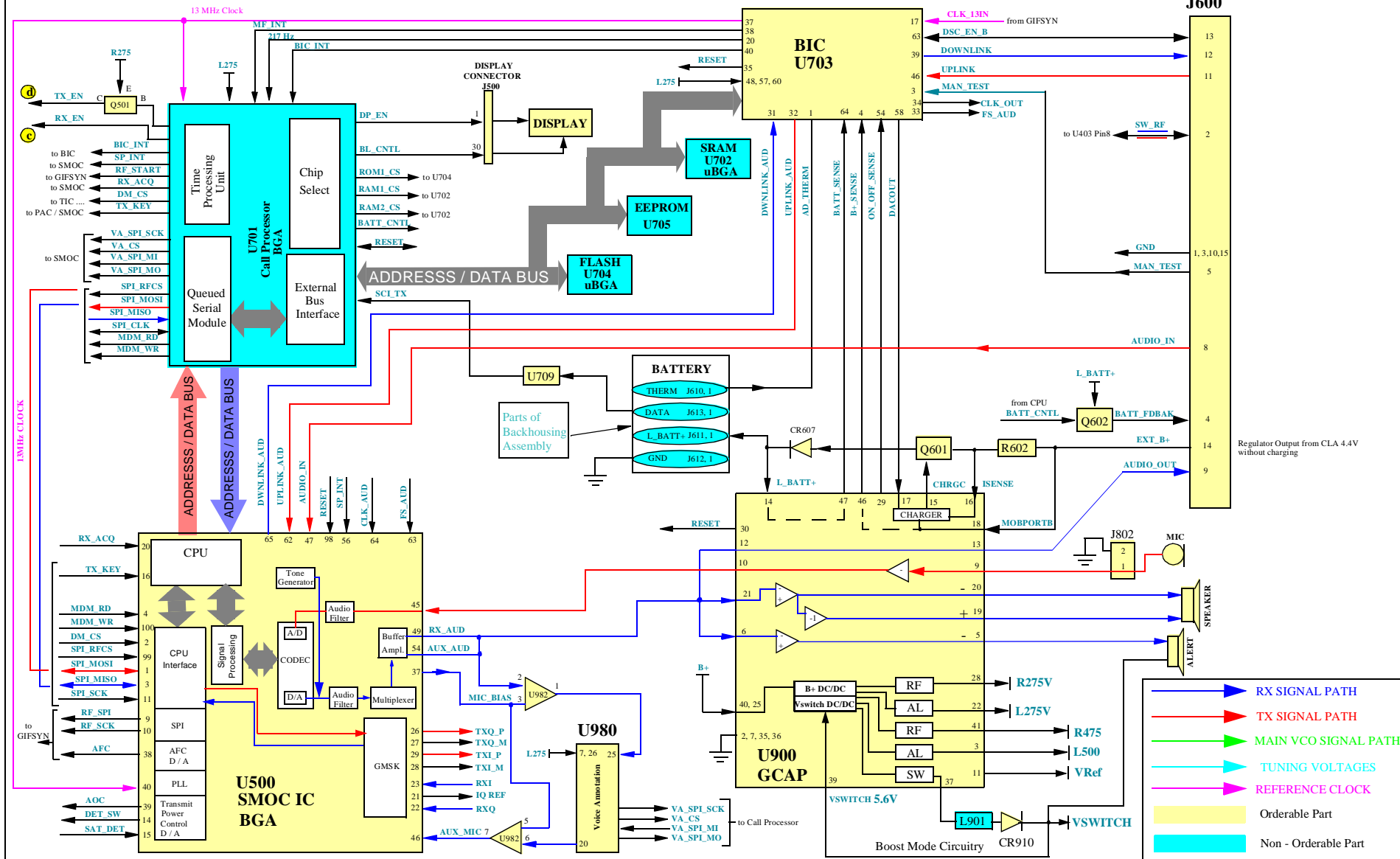


MOTOROLA



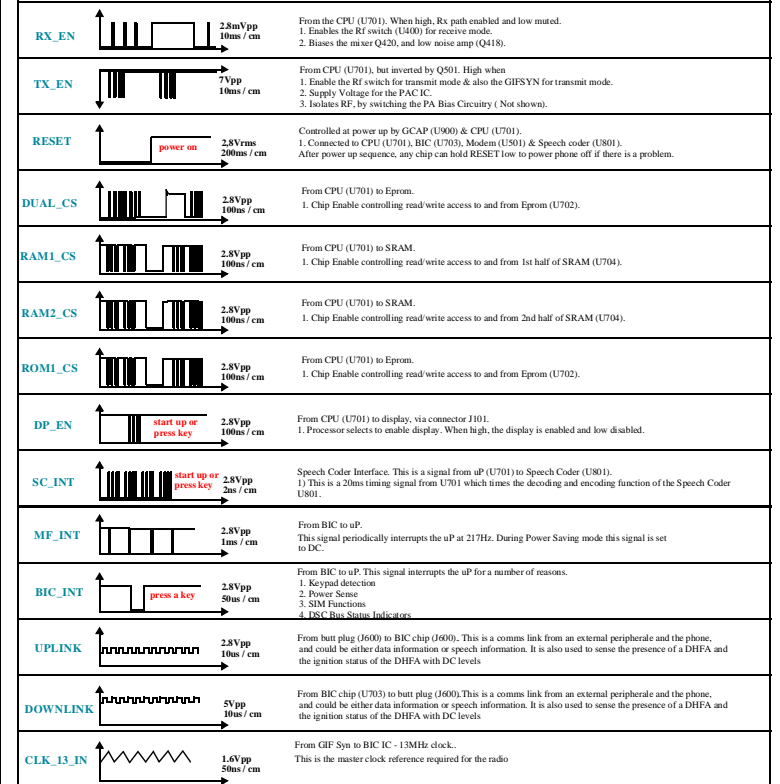
MOTOROLA

DUAL BAND ZAP AUDIO LOGIC BLOCK DIAGRAM

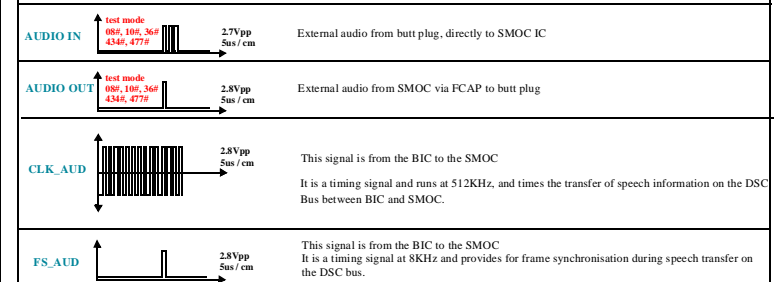


LOGIC BOARD SIGNALS

Measured in standby mode



Measured in test mode



AL LAYER - ORDERABLE SPARES

Part Designator	Part Description	Part Number	Part Designator	Part Description	Part Number
Alert	Alert	5009005J03	Q601	Power Transistor Charging	4809579E04
BT700	Connector Real Time Clock	0909888M01	Q602	Transistor Battery Feedback	4809937C05
CR607	Diode Charge Line	4809606E07	R602	Resistor I Sense	0680195M64
CR910	Diode Switched Supply	4809653F02	U500	SMOC IC	5199332C04
J500	Keyboard Connector	2809424M01	U703	BIC IC	5109962C11
J600	Connector-Extern	0909449B03	U900	GCAP	5109632D75
J603	Connector Vibra	0909888M01	U980	Voice Annotation IC	5109152M07
J802	Connector Microphone	0909195E01	U982	Amlifier IC	5109731C03
J803	Connector Speaker	0909888M04	SH11	Shield Call Processor	2609482M01
J900	SIM Connector	3909426M01	SH12	Shield GCAP	2609481M01
LS802	Speaker	5009076E12	SH13	Shield SMOC	2609483M01
Mic	Microphone	5009536H15	SH14	Shield BIC / EEPROM	2609484M01
Q501	Transistor TX_EN	4809607E05			

TEST COMMANDS

#	press 2 sec.	Enter Manual Test Mode
01 #		Exit Manual Test Mode
07 #		Mute Rx Audio Path
08 #		Unmute Rx Audio Path
09 #		Mute Tx Audio Path
10 #		Unmute Tx Audio Path
11xxxx #		Program Main Local Osc. to Channelbb
12xx #		Set Tx Power level to fixed valure
19 #		Display SW Version Number of Call Processor
20 #		Display SW Version Number of Modem
22 #		Display SW Version Number of Speech Coder
25 #		Set Continuous AGC
26xxxx #		Set Continuous AFC
31x #		Initiate Pseudo-Random Sequence with Midamble
33xxxx #		Synchronize to BCH Carrier
36 #		Initiate Acoustic Loopback
37 #		Stop Test
45xxxx #		Serving Cell Power Level
46 #		Display Current Valture od AFC DAC
47x #		Set Audio Volume
58 / xxxxxx #		Display / Modify Security Code
59 / xxx #		Display / Modify Lock Code
60 #		Display IMEI
7100 #		Display Error Code

POWER UP DEBUG

- Tie watchdog as shown in Signal Flow diagram, and supply power to radio:
- Check that there is B+ present at input to GCAP on pin 40. If not, could be problem with Battery Select Circuitry (Q906)
 - GCAP should then drive R275, L275 and VRef. If these are not present, could be a problem with GCAP itself.
 - Verify collectors of regulators Q221 and Q222 are both around 2.75V.
 - If ok, then check that the SMOC drives the Xtal Varactor Diode CR201 on the AFC line with a DC Voltage.
 - If ok, then follow 13MHz path through GIF SYN & BIC and then to Call Processor and SMOC.
 - If ok, then check chip enables from Eprom, and SRams at Test Points.
 - If ok, then verify Reset Line.

COMMON PROBLEMS

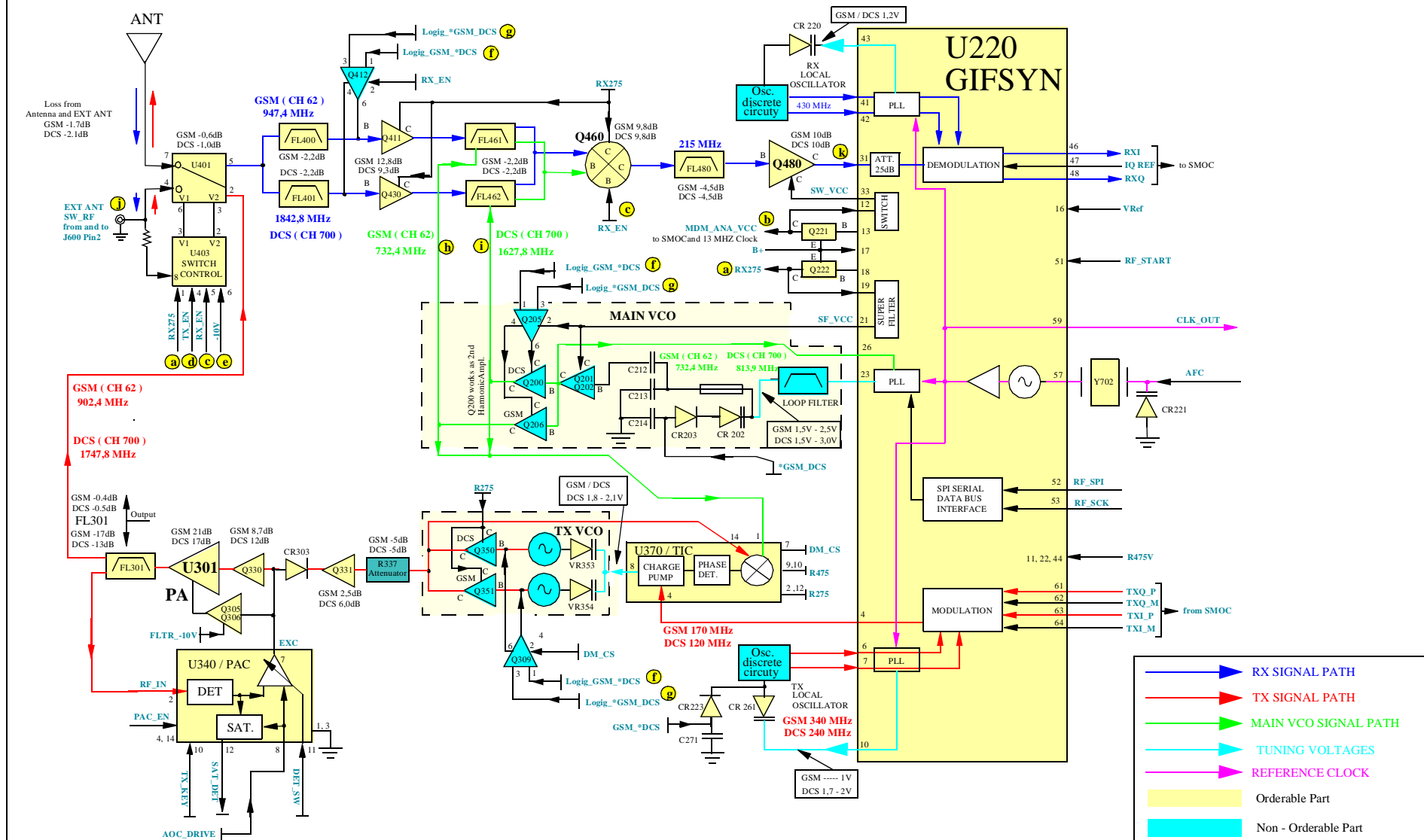
Customer Complaints	Special Note	Part	Prefix	Reason

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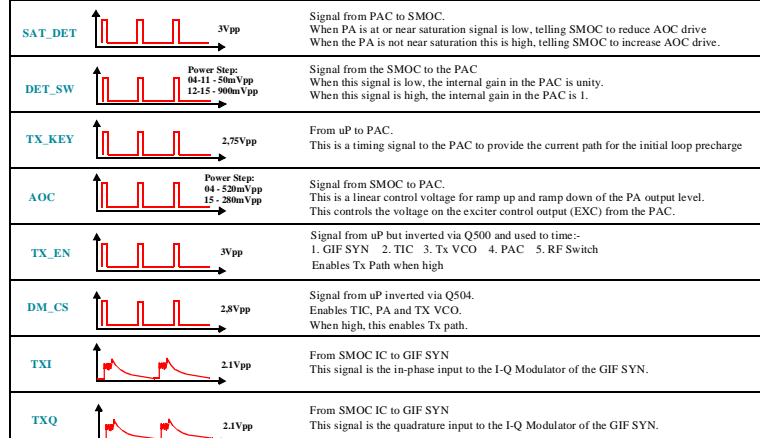
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DUAL BAND ZAP RF BLOCK DIAGRAM

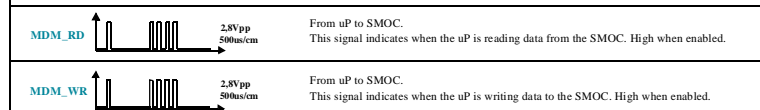


RF BOARD SIGNALS

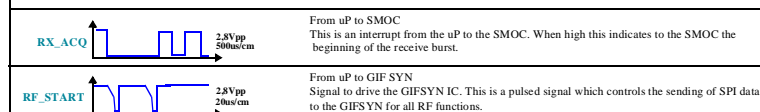
Tx SIGNALS - 110062#, 1215#, 310# Frequency 217Hz - 1ms/cm



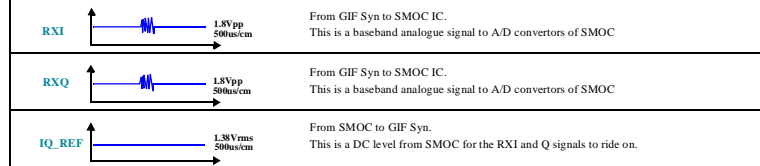
Modem Callprocessor Interface



Rx SIGNALS - In Standby Mode



Rx SIGNALS - 110062#, 262000#, 25013#, 241# Frequency 217Hz - 1ms/cm



RF LAYER - ORDERABLE SPARES

Designator	Description	Number	Designator	Description	Number
A1	Antenna Connector	3909155T01	Q350-351	TX VCO Transistor	4809940E01
CR202	Main VCO Varactor	4809641F02	Q411	Receive Power Transistor	4809527E24
CR203	Main VCO Diode	4809948D10	Q412	GSM / DCS Switch	4809939C07
CR220	RX Local Osc. Varactor	4809641F02	Q430	Receive Power Transistor	4809527E32
CR221	Master Xtal Varactor	4809641F04	Q460	Receive Mixer Transistor	4809527E20
CR223	Tx Local Osc. Diode	4809948D05	Q480	IF Isolation Amplifier	4809940E01
CR261	Tx Local Osc. Varactor	4809641F02	U220	GIFSYN IC	5109632D92
CR303	TX Exciter Diode	4809948D10	U401	Antenna Switch IC	5109572E04
FL301	1st Rx Filter	9109193T03	U403	Switch Control	5109923D14
FL400	2nd Rx Filter	9109144M01	U301	PA Dual FET IC	4809527E31
FL401	VCO Filter	9109111C08	U370	TIC IC	5109879E12
FL480	IF Saw Filter	9109035M01	U340	PAC IC	5109632D91
FL461	EXT Antenna Connector	9109157M01	VR353	TX VCO Varactor	4809877C06
FL462	GIF SYN Power Transistor	9109429J04	VR354	TX VCO Variator	4809877C04
Q200	Main VCO Transistor	4809527E30	SH1	Shield Low Noise Ampl.	2609474M01
Q201-202	Main VCO Transistor	4809527E24	SH2	Shield PA	2609475M01
Q205	GSM / DCS Switch	4809937C07	SH3	Shield GIFSYN	2609476M01
Q221-222	Supply Transistor	4809579E18	SH4	Shield Exiter	2609477M01
Q305-306	PAC Transistor	4809939C06	SH5-SH7	Shield VCO TIC	2609480M01
Q309	GSM / DCS Switch	4809939C07	SH8	Shield Mixer Iso Ampl.	2609478M01
Q330	TX Buffer	4809527E26	SH9	Shield Rf Switch	2609479M01
Q331	TX Predriver	4809527E24			

TEST COMMANDS

#	press 2 sec.	Enter Manual Test Mode with Test Card
01 #		Exit Manual Test Mode
07 #		Mute Rx Audio Path
08 #		Unmute Rx Audio Path
09 #		Mute Tx Audio Path
10 #		Unmute Tx Audio Path
11 xxxx #		Program Main Local Osc. to Channel
12 xx #		Set Tx Power level to fixed value
19 #		Display SW Version Number of Call Processor
20 #		Display SW Version Number of Modem
22 #		Display SW Version Number of Speech Codec
25 #		Set Continuous AGC
26xxxx #		Set Continuous AFC
31x #		Initiate Pseudo-Random Sequence with Midamble
33xxxx #		Synchronize to BCH Carrier
36 #		Initiate Acoustic Loopback
37 #		Stop Test
45xxxx #		Serving Cell Power Level
46 #		Display Current Value of AFC DAC
47x #		Set Audio Volume
58 / xxxxxx #		Display / Modify Security Code
59 / xxx #		Display / Modify Lock Code
60 #		Display IMEI
7100 #		Display Error Code

RECEIVE DEBUG - GSM MODE

Before actually removing any cans it may be worth checking the RX275 (a), MDM_ANA_VCC (b), RX_EN (c), -10V (e) and if the Logig_GSM_DCS (f) is high to switch the output of Q412 Pin6 and Q205 Pin4 to high.

TEST MODE: Type in Key commands: 110062#, 262000#, 25013#, 241#. Test for a set level eg. (-30dB's) at point (i) to compensate cable losses.

The only real short-cut we can take is by probing the 215MHz test point (k) (pin 31 of GIF).

- If the 215 is OK then we can assume problem lies around GIF, either 430MHz Local Oscillator or in generation of RXI and RXQ. The can SH03 should then be removed. Check that IQ Ref from the SMOC is around 1.38Vdc and then the RXI and Q outputs from the GIF to check which is faulty.

- If the 215MHz is low probe the RF inputs to the Mixer to see which RF path (RF INPUT or MAIN VCO) the fault lies on.

- If Main VCO is low, the main suspicions are with the main VCO, or the VCO filter (FL461/462) and the SH07 can should be removed.

- If the input to the filter is low, then there is some discretes under the VCO can. Check SF_VCC U220 Pin23 and Main VCO tuning voltage U220 Pin21.

- If RF INPUT, and the MAIN VCO OK, the main suspicions are with the 2 input filters FL400 and FL401 and the can SH01 should be removed. If the signal is low at the input to these, it could be losses caused by the Antenna Switch U401.

- If 947.4 and 794.4 RF values are fine but 215MHz into GIF is low (k), then we must also remove can SH08. The SAW filter (FL480) and IF Isolation AMP (Q480) is located under here.

FREQUENCIES GSM / DCS

GSM / CHANNEL	Tx	Rx	MAIN VCO	Rx LF	Rx IF LO	Tx LF	Tx IF LO
1-Low	890.2	935.2	782.2	215	430	170	340
62-Middle	902.4	947.4	794.4	215	430	170	340
124-High	914.8	959.8	806.8	215	430	170	340
DCS / CHANNEL	Tx	Rx	MAIN VCO	Rx LF	Rx IF LO	Tx LF	Tx IF LO
1-Low	1710	1805	1590	215	430	120	240
700-Middle	1747.8	1842.8	1627.8	215	430	120	240
124-High	1785	1880	1665	215	430	120	240

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